Heidi Goes* and Koen Bostoen

Progressive vowel height harmony in Proto-Kikongo and Proto-Bantu

Abstract: The systematic comparison of the different types of progressive Vowel Height Harmony (pVHH) attested within the Kikongo Language Cluster (KLC) leads to the conclusion that this common Bantu process of long-distance assimilation cannot be reconstructed to Proto-Kikongo. The '(a)symmetric-pVHH' and 'back-pVHH' patterns, the two main and structurally different kinds of pVHH within the KLC, emerged independently and relatively late within two distinct subgroups, viz. South Kikongo and North Kikongo respectively. Moreover, the '(a)symmetric-pVHH' pattern further spread from a South Kikongo focal area coinciding with the heartland of the Kongo kingdom to other parts of the KLC through contact-induced dialectal diffusion. Furthermore, the historical-comparative evidence from the KLC suggests that neither symmetric nor asymmetric pVHH should be reconstructed to Proto-Bantu, the most recent common ancestor of all Bantu languages.

Keywords: Bantu, Kikongo, progressive vowel height harmony

1 Introduction

Proto-Bantu has been reconstructed with seven vowel phonemes (Meinhof and van Warmelo 1932: 33; Guthrie 1967: 52; Meeussen 1967: 83), currently noted as *i *ɪ *e *a *o *ʊ *u (Bastin et al. 2002); *i and *u are known as first-degree vowels based on their aperture, *ɪ and *ʊ as second-degree and *e and *o (phonetically [ɛ] and [ɔ] in most present-day Bantu languages) as third-degree vowels. All seven vowels occur in Proto-Bantu roots, but only four of them in Proto-Bantu noun class prefixes and verbal derivation suffixes (also known in the Bantuist tradition as 'verb (root) extensions'), i.e. *i *ɪ *a *ʊ. Nonetheless, in most current-day Bantu languages, reflexes of the Proto-Bantu mid-vowels *e and *o do appear in these affixes as a result of vowel harmony, which is one of

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the most widely attested assimilatory processes across Bantu, especially vowel height harmony (VHH) (Hyman 2003: 46).

Harmony can be broadly defined as the requirement that "two or more not-necessarily adjacent segments must be similar in some way" (Archangeli and Pulleyblank 2007: 353). Vowel harmony is "a regularity [...] requiring vowels in certain grammatical domains to agree in terms of specific phonological features" (Gafos and Dye 2011: 2164). It is "a phonological process that occurs in languages that require adjacent vowels to share a particular feature value (e.g. back, round, tense)" (Finley 2008: 1). One common phonological feature conditioning vowel harmony in the world's languages, and certainly in Bantu, is height. From a phonetic point of view, vowel height can be defined articulatorily (i.e. based on the height of the tongue body), acoustically (i.e. regarding the first formant or F1) and/or auditorily (i.e. as perceived by the listener and represented two-dimensionally on the vertical axis as opposed to backness represented on the horizontal axis) (Pulleyblank 2011: 492–493).

In this paper, we focus on a vowel-height pattern that is very widespread in Bantu and accounts for the fact that certain verbal derivation suffixes do have mid-vowels in certain present-day languages unlike their etymons reconstructed in Proto-Bantu. This common Bantu assimilatory rule primarily affects the reflexes of those Proto-Bantu verbal derivation suffixes reconstructed with a second-degree vowel (i.e. *ɪ *ʊ), such as applicative *-ɪd, neuter *-ɪk, impositive *-ɪk and separative *-ʊd/*-ʊk (Schadeberg 2003: 72), and lowers their high vowel to a mid-vowel when the preceding verb root contains a mid-vowel (Hyman 2003: 46; Pulleyblank 2011: 497). Since this process applies from left-to-right, we call it here 'progressive Vowel Height Harmony' (pVHH).[1] As illustrated in (1), the applicative suffix in the 5-vowel (5V) language Yao (P21) has the default form **-il**, but is realized as **-el-** when the root contains a front or back mid-vowel (**e** or **o**).

(1)   Yao (P21) (Ngunga 1997: 50)
      pet-el-   'ornament for'   vs.   **dim-il-**   'cultivate for'
      soom-el- 'read/study for'   **wut-il-**   'pull for'
                                             saam-il- 'move to'

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[1] This progressive type of VHH is to be distinguished from an anticipatory type of VHH that is also common within the KLC. It applies from right-to-left and involves the interaction between the (mid-)vowel of the root and the final vowel of the aspectual verb ending reconstructed in Proto-Bantu as **-ide** (Bastin 1983b; Hyman 1998). VHH of this kind, called regressive VHH, is not dealt with in this article.

The long-distance assimilatory process of pVHH is widespread in Bantu and manifests considerable cross-linguistic variation. One parameter of differentiation is whether it is only triggered by mid-vowels in the root, as in Yao in (1), or whether it also occurs when the root vowel is low as in Pende (L11) (Niyonkuru 1978; Hyman 1999: 242; Pulleyblank 2011: 497) and closely related Kwezo (L13), both 5V languages. As shown in (2), the high vowel of the causative extension **-is-** is also lowered to a mid-vowel in Kwezo when the root vowel is **a**. PVHH can thus be triggered by (i) only mid-vowels in the verb root as in Yao (1) and many other Bantu languages or (ii) and low mid-vowels in the verb root as in Pende, Kwezo (2) and a few more Bantu languages (Pulleyblank 2011: 497), especially in the South-West (Hyman 1999: 243).

(2) Kwezo (L13) (Forges 1983: 281–282, 433)
    zĕz-es ‘make put down’ vs. **sĭy-is** ‘make kill’
    dŏg-es ‘make fry’   **vŭz-is** ‘make uproot’
    gănd-es ‘make tie’

Another parameter of variation is whether pVHH only affects the suffixes reconstructed with the second-degree high vowels *ɪ and *ʊ (applicative *-ɪd, neuter *-ɪk, impositive *-ɪk and separative *-ʊd/*-ʊk) or also extends to suffixes reconstructed with a first-degree high vowel, such as causative *-ici (Bastin 1986: 73ff)[2] and the aspectual verb ending *-ide (Bastin 1983b: 12ff). In contrast to Kwezo in (2), verb roots in the 5V language Manyo (K332) combining with the causative suffix **-it** (<*-ici) never trigger pVHH on it. However, the applicative suffix **-ir** does undergo pVHH if the vowel of the verb root is mid or low, as shown in (3).

(3) Manyo (K332) (Möhlig 1967)
    kêng-er ‘view, watch’   vs. **hén-it** ‘kidnap’
    kór-er ‘lean on’   **kôl-it** ‘cause harm, torture’
    wáp-er ‘be beautiful for’   **ghámb-it** ‘cause to speak’
    dîng-ir ‘coil, wind around’   **dîm-it** ‘extinguish (e.g. a fire)’
    dúk-ir ‘run to’   **fût-it** ‘make pay, punish’

The most important parameter of variation in pVHH across Bantu languages is whether verbal derivation suffixes with a front or back vowel undergo pVHH in

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2 As Bastin (1986: 73ff) observes herself, the degree of aperture of the initial vowel of **-ici** is difficult to establish for Proto-Bantu. It could also be the second-degree vowel *ɪ, since the suffix never triggers, in Bantu 5V languages, the mutation of the preceding consonant known as ‘Bantu Spirantization’ (Schadeberg 1995; Bostoen 2008).

the same way or not. In this regard, Hyman (1999) distinguishes between symmetric and asymmetric pVHH.

The term 'symmetric pVHH' is used when front and back vowels in verbal derivation suffixes are affected under exactly the same conditions, i.e. both following roots having either a front or a back vowel, as is the case in Mongo (C61) in (4), which has seven vowel phonemes, i.e. **i e ɛ a ɔ o u**. In Mongo, close-mid-vowels **e** and **o** correspond to ⋆**ɪ** and ⋆**ʊ**, respectively, and open-mid-vowels **ɛ** and **ɔ** are reflexes of ⋆**e** and ⋆**o**, respectively. The unconditioned reflexes of the Proto-Bantu ⋆**-ɪd** and ⋆**-ʊd** suffixes are **-el** and **-ol**, respectively. Their allomorphs manifesting pVHH with root open-mid vowels are **-ɛl** and **-ɔl**.

(4)   Symmetric pVHH in Mongo (C61) (Hulstaert 1957, Hulstaert 1961)

kɛ́ng-ɛl	'inspect for'	vs.	**kel-el**	'do for'	vs.	**kis-el**	'sit on'
sɔ́l-ɛl	'test for'		**fóm-el**	'hit on'		**kúnd-el**	'hit on'
lɛng-ɔl	'lessen'		**leng-ol**	'slice'		**ís-ol**	'discover'
kɔ́m-ɔl	'unpack'		**kot-ol**	'put down'		**túng-ol**	'liberate'
			samb-ol	'provoke'		**bál-el**	'shoot on'

The term 'asymmetric pVHH' is used when front and back vowels in verbal derivation suffixes are not affected under the same conditions. Extensions with a front vowel undergo pVHH when the root has either a front or a back mid-vowel, while verbal derivation suffixes with a back vowel are only lowered when the root has a back mid-vowel, but not when it has a front mid-vowel. Bleek (1862: 62) was the first to observe this asymmetry in the 5V language Herero (R31) (Hyman 1999: 255). As shown in (5), this asymmetry also occurs in the 5V language Swahili (G42), where the mid-vowels [ɛ] and [ɔ] are represented orthographically as <**e**> and <**o**>.

(5)   Asymmetric pVHH in Swahili (G42) (TUKI 2001)
       a. Applicative (default form **-i**)
       teg-e-a   'lay trap for'   vs. **fung-i-a**   'bar, ban, confine (close for)'
       shon-e-a 'sew for'
       b. Separative (default form **-u**)
       teg-u-a   'disassemble a trap'
       shon-o-a 'unsew'   vs. **fung-u-a**   'open'

Scholars used to agree that VHH, and more specifically pVHH, is a phonological feature that goes back to Proto-Bantu (Greenberg 1951: 818–819; Bastin 1983a: 32; Stewart 1983: 35). Disagreement existed, however, on whether symmetric or asymmetric pVHH should be reconstructed (Hyman 1999: 253). Based on a

comparison with vowel-harmony patterns elsewhere in Niger-Congo, Greenberg (1951: 814) argues for symmetric pVHH in Proto-Bantu. Meeussen (1967: 84), on the contrary, reconstructs asymmetric pVHH, probably because this type is the most widespread within the Bantu domain. Schadeberg (1982: 61) and Bastin (1983a: 33), both students of Meeussen, invoke indeed distributional grounds for the reconstruction of asymmetric pVHH in Proto-Bantu (Hyman 1999: 254–255). As the distribution map in Hyman (1999: 239) shows, symmetric pVHH is mainly attested in the north-western part of the Bantu area, though not exclusively. It also occurs in some 7V languages further east, such as Mituku (D13, Eastern DRC), Gusii (E42, Kenya) and Kuria (E43, Kenya) (Hyman 1999: 241).

In his extensive comparative study of pVHH patterns within Bantu, Hyman (1999: 288) challenges earlier thinking and concludes that pVHH did not exist at all in Proto-Bantu, neither symmetric nor asymmetric. However, Hyman only reaches this original conclusion after also having revised the reconstruction of the vowels of Proto-Bantu verbal derivation suffixes commonly associated with pVHH. To account for the differential pVHH realization within these suffixes across Bantu languages, Hyman (1999) proposes to reconstruct some of them with a third-degree vowel, i.e. applicative ***-ed** (instead of ***-ɪd**) and neuter/stative ***-ek** (instead of ***-ɪk**), as opposed to others for which he sticks to the original second-degree vowel, i.e. causative ***-ɪc-i**[3], separative/reversive intransitive ***-ʊk**, and separative/reversive transitive ***-ʊd**. In his view, pVHH is so often asymmetric in the front vs. back series, not because these two types of vowels react differently to this assimilatory rule, but because these suffixes had different degrees of aperture to start with. In other words, pVHH patterns observed with front vowels in verbal derivation suffixes would actually involve the raising of ***e**, except if the root contains a mid-vowel (as well as **a** in parts of zones K and R). He refers to this process as "peripheralization", i.e. the tendency for vowels to migrate to the peripheries of the vowel space: ***e** becoming a high vowel except where ***e** is shielded by a preceding third-degree vowel (Hyman 1999: 269). PVHH patterns observed with back vowels in verbal derivation suffixes, on the other hand, would involve the lowering of ***ʊ** to degree 3, viz. **o**, by assimilation to a (back) mid-vowel in the root. The reconstruction of causative ***-ɪc-i** with an initial second-degree vowel would then account for the fact that in certain Bantu languages this suffix joins the applicative and neuter/stative suffixes in terms of pVHH, while it does not in others.

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3 In response to Bastin (1986), Hyman (1999: 274–275) argues for the reconstruction of a Proto-Bantu long causative suffix with an initial second-degree front vowel, viz. ***-ɪc-i**, instead of one with two first-degree front vowel, viz. ***-ic-i**. Guthrie (1970: 219) also considers ***-ɪc-i** to be the original form from which ***-ic-i** was subsequently derived following the regressive assimilation of the first-degree height of the second vowel (Bastin 1986: 65).

In this article, we argue in favour of Hyman's original claim that pVHH should not be reconstructed to Proto-Bantu, neither symmetric nor asymmetric. However, we depart from his view that this necessarily implies the reconstruction of derivational suffixes with vowels having different degrees of aperture. We do so by relying on comparative evidence from one specific Bantu subgroup, namely the Kikongo Language Cluster (KLC), a disparate continuum of 40–50 closely related Bantu language varieties spoken in the wider Lower Congo region from southern Gabon throughout the southern part of the Republic of the Congo (or Congo-Brazzaville), the western part of the Democratic Republic of the Congo (DRC or Congo-Kinshasa) and the northern provinces of Angola (Cabinda, Zaire and Uíge) (cf. Bostoen and de Schryver 2015; De Kind et al. 2015; de Schryver et al. 2015; Dom and Bostoen 2015). Languages from the KLC actually play a crucial role in Hyman's historical linguistic interpretation of pVHH. As a run-up to his alternative theory involving Proto-Bantu derivational suffixes with vowels having different degrees of aperture, Hyman (1999: 264–265) develops an important reflection on the variation observed between southern Kikongo, which previous authors such as Guthrie (1962: 102) and Clements (1991: 59) had identified as the only 5V language with symmetric pVHH, and several other Kikongo varieties that miss pVHH:

> If asymmetric VHH is reconstructed [to Proto-Bantu], then some Kongo dialects would have generalized it to symmetric [...] while others would have lost left-to-right VHH altogether [...]. 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, the dialects with symmetric VHH fit in well in the situation in zone C (Leitch 1996), which have 7V. [...] 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 [...] pattern with 7V languages like Mongo C.61 [...] Those which do not have harmony [...] pattern instead with languages like Koyo C.24.

In this article, we show that pVHH variation within the KLC cannot be reduced to a simple opposition between symmetric pVHH and no pVHH. Based on the extensive comparative documentation collected as part of the KongoKing project (2012–2016)[4] and as part of the first author's PhD project (2014–2019), we are

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4 The KongoKing project (2012–2016) was an interdisciplinary and interuniversity research program led by the second author and funded by Starting Grant No. 284126 of the European Research Council and by the Special Research Fund of Ghent University. See http://kongoking. net for the archived project website.

now much better equipped than Hyman (1999) was to assess variation in the KLC along any possible parameter. We provide evidence here that besides symmetric pVHH (Section 2.1) and no pVHH (Section 2.6), the following types of pVHH are attested within the KLC: asymmetric pVHH (Section 2.2), back pVHH (Section 2.3), total pVH (Section 2.4) and irregular pVHH (Section 2.5). Map 1 presents the distribution of these different types of pVHH within the KLC.
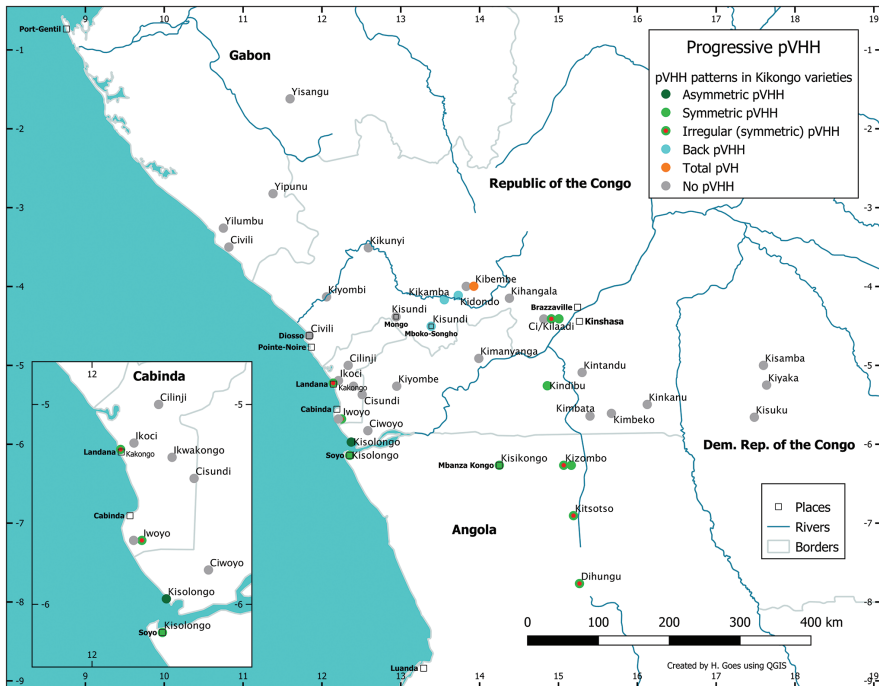
Map 1: Distribution of pVHH patterns within the Kikongo Language Cluster.

What is more, thanks to a better understanding of the phylogenetic structure of the KLC (de Schryver et al. 2015), we can also better assess now the historical significance of pVHH variation within the KLC. The KLC has been shown to constitute a discrete subclade within the West-Coastal or West-Western branch of the Bantu language family (Guthrie 1962; de Schryver et al. 2015; Grollemund et al. 2015). It includes all of Guthrie's H16 Kikongo language varieties, all other members of his 'H10 group', his 'B40 Shira-Punu' and 'H30 Yaka' groups, as well as Hungan (H42) from his 'H40 Mbala-Hungana' group, and Samba (L12a) from his 'L10 Pende' group (Guthrie 1971; Maho 2009). The KLC consists of five

distinct subclades, i.e. 'South Kikongo', 'North Kikongo', 'West Kikongo', 'East Kikongo' and 'Kikongoid', in the midst of which a Central Kikongo convergence zone developed through intensive language contact (de Schryver et al. 2015). Given that the genealogical unity of the KLC has been demonstrated, it is feasible now to reconstruct the most recent common ancestor, which we call here 'Proto-Kikongo'. Based on the pVHH variation observed within the KLC, we propose in this article that Proto-Kikongo did not have pVHH and that the different types of pVHH observed today are later innovations. We also examine to what extent these innovations are in line with the phylogenetic classification by de Schryver et al. (2015), which was based on a list of 92 basic vocabulary items. Given that pVHH manifests considerable variation across the KLC, it is a good non-lexical parameter to test the lexically-based internal classification of the KLC and to possibly further refine our understanding of it.

In Section 2, we document the six different pV(H)H patterns attested within the KLC and their distribution within this genealogical Bantu subgroup. In Section 3, we provide a historical interpretation for the current-day distribution of the different pVHH patterns and assess which type should be reconstructed in Proto-Kikongo, the most recent common ancestor of the entire KLC, as well as in the intermediate ancestor languages of the different subgroups of the KLC. In Section 4, by way of conclusion, we assess the implications of our historical analysis of pVHH within the KLC for the reconstruction of this phonological process in Proto-Bantu in the light of Hyman (1999).

2 Types of pVHH within the KLC

2.1 Symmetric pVHH

An important Kikongo source in Hyman's historical interpretation of pVHH is seventeenth century South Kikongo as documented in the *Vocabularium Latinum, Hispanicum, e Congense* from 1652, which was copied and handed down to us by the Flemish Capuchin Father Joris Van Gheel (Hildebrand 1940). Hyman (1999) relies on the Kikongo-French-Dutch re-edition by Van Wing and Penders (1928), which is not always faithful to the original as we know thanks to a fully digitized version of Van Gheel's manuscript (cf. De Kind et al. 2012). We therefore decided to systematically test the pVHH patterns as they are documented in the original dictionary. Van Gheel (1652) contains 10,512 Latin lemmas, 2,337 of which (i.e. 22.2%) are verbs. These Latin verbs have 3,826 translation equivalents in Kikongo corresponding to 3,132 distinct verb stems.

Only 5.3% of these different Kikongo verbs, i.e. 166 in total, are derived verbs, as in (6), whose root has a mid-vowel and whose extension(s) could undergo pVHH. Such verbs manifest symmetric pVHH, as Hyman (1999) had also observed in the Van Wing and Penders (1928) re-edition. As shown in (6c), the reflex of Proto-Bantu causative **-ici**, whose default form is **-is** (sometimes noted as <**iss**>), is also subject to pVHH. As shown in (6e), following a nasal, extensions ending in a liquid, such as the transitive separative, whose default form is **-ul** in Kikongo, undergo nasal harmony, another common Bantu assimilatory process (Greenberg 1951; Hyman 2003: 57). Nasal harmony is found throughout most of the western part of the Bantu area (Greenberg 1951; Stewart 1999). Examples, such as **cu-enz-el-ec-a** 'apendo' (attaching, fastening) and **cu-cond-el-ec-a** 'adunco' (be hooked, bent), involving sequences of verbal derivation suffixes show that pVHH not only applies to the suffix immediately following the root containing a mid-vowel; the vowels of both **-il** and **-ik** <**ic**> are lowered here.

(6) Symmetric pVHH in 17th c. South Kikongo (Van Gheel 1652)
    a. Applicative (default form **-il**) undergoing pVHH following roots with **e** and **o**
    cü-bhel-el-a   'albesco'   (to become bright)[5]
    cu-bhobh-el-a   'intercedo, proscribo'   (to announce)
    b. Impositive (default form **-ik** <**ic**>) undergoing pVHH following roots with **e** and **o**
    cu-em-ec-a   'lacto'   (to entice, to wheedle)
    cu-son-ec-a   'escribo'   (to write)
    c. Causative (default form **-is**) undergoing pVHH following roots with **e** and **o**
    cú-end-es-a   'ambulo'   (to go about)
    cu-tom-ess-a   'decoro'   (to beautify)
    d. Separative (intransitive) (default form **-uk** <**uc**>) undergoing pVHH following roots with **e** and **o**
    cu-semp-oc-a   'redundo'   (to be too numerous)
    cu-lol-oc-a   'indulgeo'   (to be indulgent, kind)

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5 In this article, we transcribe verb forms as noted in the original source, but add morphological parsing. If the verb form includes the noun class prefix **ku-**, which commonly marks infinitives in Kikongo and elsewhere in Bantu, we translate it as an English 'to' infinitive. If the verb form found in a given source does not have the noun class prefix **ku**-, we translate it as an English verb form without the infinitive marker 'to'.

e. Separative (transitive) (default form **-ul**) undergoing pVHH following roots with **e** and **o**

cu-leb-ol-a   'eludo'   (to baffle, to cheat)
cu-com-on-a   'aestimo'   (to consider, to judge)

f. Neuter (default form **-ik <ic>**) undergoing pVHH following roots with **e** and **o**

cú-bhet-ec-a   'adunco; inclino'   (to bend, to incline)
cú-mon-ec-a   'appareo'   (to appear)

Out of the 166 verb stems, 97 have a front vowel extension and 69 verb stems have a back vowel extension in the original dictionary manuscript (Van Gheel 1652) and all exhibit pVHH after both front and back root mid-vowels without exception. This is illustrated in Table 1.

Table 1: Distribution of symmetric pVHH in Van Gheel (1652).

Extension	Total occurrences	Root with e		Root with o		% of verbs with pVHH
		pVHH	No pVHH	pVHH	No pVHH	
Applicative **-il**	35	18	–	15	–	100%
Impositive **-ik**	20	12	–	8	–	100%
Causative **-is**	42	23	–	19	–	100%
Separative tr. **-ul**	44	21	–	23	–	100%
Separative intr. **-uk**	25	15	–	10	–	100%

In Van Gheel (1652), the lowering of extension vowels is also observed following roots (7a) or other extensions (7b) having a low vowel, though very irregularly (7c). The lowering of extension vowels after a preceding **a** is attested throughout the KLC, but just like in seventeenth-century South Kikongo never in a fully regular way. For reasons of space, we will not further consider here this specific type of pVHH.

(7)   Irregular lowering of mid-vowels in verbal derivation suffixes after low vowels in 17th c. South Kikongo (Van Gheel 1652)

a. Lowering following root vowel **a**

cu-bab-ess-a   'duro'   (to harden)
cú-quiab-ol-a   'admoneo'   (to warn)

b. Lowering and nasalization following the suffix **-am**

cu-but-am-en-a	'fomento'	(to foment)
cu-nang-am-en-a	'obstino'	(to be determined)
cú-úúmb-am-en-a	'propendeo'	(to lean over)

c. Absence of vowel lowering

cú-bar-iss-a	'obdúro'	(to persist, to endure)
cú-as-úl-a	'propello'	(to drive, to push forward)
cu-fung-am-in-a	'comprehendo'	(to seize)
cu-tu-am-in-a	'antecedo'	(to precede)

In its direct descendant, i.e. the South Kikongo variety now called Kisikongo and spoken at present-day Mbanza Kongo (former San Salvador), the ancient capital of the Kongo kingdom (cf. Bostoen and de Schryver 2018b) of the variety documented by Van Gheel (1652), symmetric pVHH has been observed by Bentley (1887) and Ndonga Mfuwa (1995). This is shown in the Appendix example sets (16) and (17).

Another South Kikongo language with symmetric pVHH is Kisolongo (H16a) as reported by Tavares (1915) for the language's southern variety spoken along the northern Angolan coastal area, south of the Congo mouth. Apart from two exceptions, all relevant examples in this source manifest symmetric pVHH, as exemplified in (18) in the Appendix.

In Kizombo (H16h), another main South Kikongo variety, spoken east of Kisikongo, pVHH is also systematically symmetric according to the data found in Carter and Makondekwa (1987), as listed in (19) in the Appendix. Nevertheless, in the variety of Kizombo surveyed by Mpanzu (1994), symmetric pVHH is irregular; see for instance **yék-ík-à** in (20c) in the Appendix, instead of the expected **yék-ék-à**. It should be noted that the variety of Kizombo described by Mpanzu (1994) deviates more from Kisikongo than the one described by Carter and Makondekwa (1987) in other domains as well, such as for the merger of augment types (cf. Bostoen and de Schryver 2018b).

Outside South Kikongo, as shown in (21) in the Appendix, symmetric pVHH has been identified in Kindibu (Coene 1960), the main Kikongo variety south of the Congo River and west of the Inkisi River in present-day Congo-Kinshasa. In the phylogenetic classification of de Schryver et al. (2015), Kindibu is part of the centrally located convergence zone called Central Kikongo. However, within the KLC, Kindibu shares certain unique phonological innovations with other South Kikongo varieties, such as intervocalic ***b** loss, which suggest that the language may have originally belonged to South Kikongo, from which it drifted away due to change induced through contact with varieties from other subgroups (Bostoen and de Schryver 2018b).

The only Kikongo variety truly outside of the South Kikongo region where symmetric pVHH has been observed is Cilaadi (H16f). This language variety belongs to the North Kikongo subgroup and is spoken to the west and north-west of Brazzaville. All attestations found in Jacquot (1985) manifest symmetric pVHH, as shown in (22) in the Appendix. Mabiala (1999) and Hyman (1999) also report symmetric pVHH in Cilaadi. However, examples of pVHH are absent from the Kilaadi variety as reported in Dhienda (1972), as illustrated in (33) in the Appendix. In still other varieties of the same language, such as Kilaari reported in Ngoma-Nkanga wa ne Ndimbu (1975), symmetric pVHH seems to occur irregularly, e.g. **bok-ek** 'go back to the ground', **le:ng-ol** 'flatter, caress', **tobo-zol** 'pierce excessively', but **leeng-il** 'tarnish', **twe:m-is** 'make breathe', **so:ng-is** 'show', **bwo:b-uk** 'fall down'. This apparent irregularity is possibly due to the uneven quality of the description. In any case, symmetric pVHH is attested in Cilaadi, although not regularly spread across all its varieties.

In sum, the symmetric-pVHH pattern is attested, based on the available literature, in several South Kikongo varieties from Northern Angola (Kisikongo, Kisolongo, Kizombo), a Central Kikongo variety from Congo-Kinshasa (Kindibu) and a North Kikongo variety from Congo-Brazzaville (Cilaadi).

2.2 Asymmetric pVHH

Contrary to what one may believe on the basis of previous research (e.g. Hyman 1999: 264), asymmetric pVHH does occur within the KLC. It is attested in the variety of Kisolongo studied by the Holy Ghost missionary Alexandre Visseq in the late nineteenth century. Visseq (1889a, 1889b, 1890) locates his work rather vaguely in the 'Bas-Congo', that is, probably north of the Congo mouth in the present-day DRC. Starr (1908: 86), however, identifies the Kisolongo variety documented by Visseq as the one spoken in São Antonio, now Soyo in northern Angola, south of the Congo delta, from where the description of Kisolongo by Tavares (1915) also originates. On the other hand, Njami et al. (2014) state that before being stationed in São Antonio (1883–1886), Visseq was first involved in the foundation of a mission in Boma (1880–1883), while later on he was based at Nemlao (1886–1888).[6] Both missions were located on the north bank of the Congo River (Ernoult 1995: 43). In other words, Visseq was definitely also exposed to Kisolongo as spoken in what is today Congo-Kinshasa. This might also account for the fact that he used the glossonym 'Fiote'/'Fiot' to refer to the language which he described. This name was indeed more common in the

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6 Nemlao was called after a chief of the Solongo diaspora there (Volavka 1998: 18).

coastal area north of the Congo, and probably explains why pVHH as documented for Kisolongo by Visseq (1889a, 1889b, 1890) is different from the one found in Tavares (1915) (see (18) in the Appendix). In contrast to the latter source, the sequence of **e** in the root and **o** in one or more verb derivation suffixes is never found in verb stems reported by Visseq (1889a, 1889b, 1890), only the root vowel **e** followed by suffixes containing **u**, written as <**ou**> following French spelling conventions. As shown in (8e) and (8f), extensions with a back vowel are lowered when the root also has a back mid-vowel, but not when it has a front mid-vowel. Extensions with a front vowel, on the other hand, always lower following all types of mid-vowels in the root, as shown in (8a) to (8d). No exceptions to this asymmetric-pVHH pattern have been found.

(8)   Asymmetric pVHH in 'Fiote' (Kisolongo) (Visseq 1889a)
   a. Applicative (default form **-il**) undergoing pVHH following roots with **e** and **o**

zek-el-a	'tordre'	(twist, bend)
tek-el-a	'arroser'	(irrigate)
kok-el-el-a	'déprécier, rabaisser'	(lessen, lower)
pop-el-a	'fatiguer'	(fatigue, make tired)

   b. Impositive (default form **-ik**) undergoing pVHH following roots with **e** and **o**

tent-ek-a	'nager'	(swim)
somb-ek-a	'affermer'	(lease, rent, take on lease)
somp-ek-a	'louer'	(hire)
zonz-ek-a	'emballer'	(pack)

   c. Causative (default form **-is**) undergoing pVHH following roots with **e** and **o**

zenz-ess-a	'adoucir'	(sweeten)
tom-ess-a	'rendre bon, abonnir'	(make good)
lomb-ess-a	'noircir'	(make black)
man-ess-a	'faire achever'	(make finish)

   d. Neuter (default form **-ik**) undergoing pVHH following roots with **e** and **o**

mon-ek-a	'apparaître'	(appear)

   e. Separative (intransitive) (default form **-uk**)
   Undergoing pVHH following roots with **o**:

vol-ok-a	'tomber'	(fall)
voss-ok-a	'abêtir'	(make stupid)
lol-ok-a	'absoudre'	(absolve)

Not undergoing pVHH following roots with **e**:

kess-ouk-a	'ébrécher'	(breach, chip) <ou> = u
sek-ouk-a	'émigrer'	(emigrate)

f. Separative (transitive) (default form **-ul**)

Undergoing pVHH following roots with **o**:

tob-ol-a	'percer'	(pierce)
somb-ol-a	'provoquer'	(provoke)
lomb-ol-ol-a	'avoir recours à'	(resort to, turn to)

Not undergoing pVHH following roots with **e**:

leng-oul-a	'approprier'	(appropriate)
teng-oul-a	'couper'	(cut)
tek-oul-oul-a	'revendre'	(resell)
lenv-ouk-il-a	'obéir'	(obey)

2.3 Back pVHH

A specific type of pVHH, which we call back pVHH, and whereby only extensions containing a back vowel harmonize to the vowel(s) of the verb root, is found in a number of North Kikongo varieties spoken in southern Congo-Brazzaville. This back pVHH is best documented for Kidondo (H112B) by Mfoutou (1985). As shown in (9c) and (9d), extensions with a high back vowel, i.e. the two separative suffixes **-ul** and **-uk**, lower their vowel to a mid-vowel, if the root has either **e** or **o**. On the other hand, extensions with a high front vowel are never lowered, regardless of the quality of the root vowel, as shown in (9a) and (9b), also not when they are preceded by a suffix with a lowered back vowel, as in (9d).

(9)   Back pVHH in Kidondo (Mfoutou 1985)

a. Causative (default form **-is**)

yed-is-a	'faire mûrir'	(ripen)
yen-is-a	'faire voir, laisser voir'	(make see)
seng-is-a	'balancer, osciller'	(balance)
song-is-a	'montrer, faire voir'	(show, make see)
lem-is-a	'blesser'	(injure)
leem-is-a	'allumer'	(put on, switch on)
bod-is-a	'faire pourrir, mouiller'	(make rot, wet)

b. Impositive and causative (default forms **-ik** and **-is**, respectively)

tent-ik-is-a	'superposer'	(superpose)
tend-ik-is-a	'être capable de couper'	(be capable of cutting)
somp-ik-is-a	'être capable d'emprunter'	(be capable of lending)
som-ik-is-a	'être capable de faire entrer'	(be capable of making enter)
konz-ik-is-a	'être capable d'amasser'	(be capable of amassing)
kony-ik-is-a	'être capable de s'égratigner'	(be capable of scratching)

c. Separative (intransitive) (default form **-uk**)

lef-ok-a	'se coucher'	(lay down)
kween-ok-a	's'égratigner'	(scratch)

d. Separative (transitive) (default form **-ul**)

sek-ol-a	'transvaser, verser'	(pour)
kel-ol-a	'filtrer'	(filter)
sok-ol-a	'creuser un arbre'	(hollow out a tree)
veemb-ol-a	'blanchir'	(make white)

e. Separative (intransitive) and causative (default forms **-uk** and **-is**, respectively)

lef-ok-is-a	'être capable de s'endormir'	(be capable of falling asleep)
lemv-ok-is-a	'être capable d'avoir pitié de'	(be capable of having pity)

The few relevant examples in the concise Kidondo grammar of Williams-Ngumu et al. (2015) confirm this back-pVHH pattern: **ku-hengom-ok-a** 'éviter' (to avoid) vs. **ku-tek-il-a** 'vendre à quelqu'un' (to sell to someone), **ku-ton-in-a** 'recommencer' (to begin again), **ku-yen-ik-a** 'se voir' (to see oneself). We also systematically examined the Kidondo catechism (Pouchet 1957) and found only one exception to this pattern, i.e. **long-uk-a** 'learn'. This verb form occurs four times in the text, while the expected form of the same verb undergoing back pVHH **long-ok-a** 'learn' is attested five times. These inconsistencies can probably be attributed to influence from other varieties, given that 'learn' is a very common verb.

The same back-pVHH pattern has been identified by Bouka (1989) in another North Kikongo variety, Kikamba (H112A). However, he mainly provides data highlighting the absence of front pVHH rather than the presence of back pVHH, as shown in (23) in the Appendix: extensions containing a front vowel do not harmonize to the vowel(s) of the verb root. As for back pVHH, the data in Bouka (1989) are very limited and contradictory. The only relevant examples are **tòb-ùk-a** 'se percer' (get pierced) and **tòb-ùl-a** 'percer' (pierce), both lacking pVHH. Nevertheless, dedicated fieldwork carried out by Guy Kouarata in 2016 within the KongoKing project indicates that Kikamba does have regular back pVHH, as shown in (24) in the Appendix.

During his 2016 fieldwork, Guy Kouarata also observed this specific type of back pVHH in yet another North Kikongo variety, i.e. Kisundi spoken in the area of Mboko-Songho. As shown in (25) in the Appendix, in extensions with a back vowel, the extension vowel is lowered if the root contains a back or front mid-vowel, e.g. **ku-béél-ók-a** 'to recover, to heal' and **ku-tob-ól-a** 'to pierce', while extensions with a front vowel do not undergo any kind of harmony, e.g. **ku-yénd-il-a** 'to go for' and **ku-bóóng-is-a** 'to make take'.

From a typological point of view, this pVHH asymmetry favouring back vowels, which is observed in these North Kikongo varieties, is remarkable. In many VHH languages across the world, only front vowels are allowed to undergo harmony, while few languages also allow back vowels to undergo VHH, a restriction which turns out to be cognitively biased (Finley 2008: 7, 21–22, 325–345).[7]

2.4 Total pVH

Within the KLC, there are also instances of vowel harmony where the harmonized vowel totally assimilates to the root vowel triggering the harmony, and not only to its height. We call this total progressive vowel harmony (total pVH). This type of vowel harmony is most pervasive in the North Kikongo variety Kibembe (H11), where it has scope not only over verb extensions, but also over the verb's final vowel. In Kibembe, final vowels in verb stems assimilate fully to the front/back mid-vowel of the root. This can be seen in the contrast between **bak-a** 'obtain' on the one hand and **bol-o** 'rot' and **beel-e** 'be sick' on the other hand. The default shape of the causative suffix in Kibembe is **-is**. However, the causative form of a verb stem, such as **bolo** 'rot' is **boloso** 'make rot', rather than **bolisa, bolesa** or **bolese**, which are all ungrammatical. Similarly, the default shape of the intransitive separative suffix is **-uk**, but the separative

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[7] Finley (2008) ran an experiment whereby students not speaking any language with VHH were trained for height harmony with either front or back vowel suffix alternation. In the case of height harmony with front vowel alternation, they were tested for generalization to a back vowel alternation. In the other case, they were tested for generalization to a front vowel alternation. The experiment showed robust learning for front vowel alternations, while no learning or generalization for back vowel harmony alternation was found. What is more, learners exposed to back harmony alternations generalized to front vowels, even though they showed no effect of training on back vowel suffixes. According to Finley, this observation suggests a strong bias against back vowels undergoing height harmony alternations and a bias towards front vowels undergoing height harmony alternations.

form of the verb stem **beele** 'be sick' is **beeleke** 'recover', rather than **beeluka, beeloka** or **beeloko**, which are all unacceptable (Kouarata 2015: 87, 2016). Extensions in Kibembe may also undergo full assimilation when the root has a non-mid-vowel, but this is optional and never affects the final vowel, e.g. **bik-ul-a/ bik-il-a** 'prophesy', **fun-is-a/fun-us-a** 'multiply' (Kouarata 2016). More examples of this kind of total pVH are presented in (10).[8]

(10) Total pVH in Kibembe (Kouarata 2015, Kouarata 2016)
      a. Applicative (default form **-il**)
      heek-el-e   'inviter à danser'   (invite to dance)
      heemb-el-e   'vanner'   (winnow)
      loomb-ol-o   'demander pour'   (ask for)
      b. Impositive (default form **-ik**)
      leb-ek-e   'tendre un piège'   (set a trap)
      lel-ek-e   'pendre qn ou qch'   (hang someone or something)
      bot-ok-o   'baptiser'   (baptize)
      c. Causative (default form **-is**)
      def-es-e   'prêter'   (lend)
      beel-es-e   'prendre soin d'un malade'   (take care for a sick person)
      bol-os-o   'mouiller; faire pourrir'   (make wet, make rot)
      hol-os-o   'refroidir'   (make cold)
      d. Separative (intransitive) (default form **-uk**)
      beel-ek-e   'guérir (intr.)'   (recover)
      koond-ok-o   'virer, bifurquer, courber (intr.)'   (turn, bifurcate, bend)
      e. Separative (transitive) (default form **-ul**)
      sek-el-e   'transvaser'   (decant)
      boond-ol-o   'renverser'   (knock over)
      dzok-ol-o   'picoter'   (peck)

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8 Note that because of this type of vowel harmony, it is not always easy to distinguish synchronically in Kibembe between reflexes of applicative ***-ɪd** and separative ***-ʊd** on the one hand and between reflexes of impositive ***-ɪk** and separative ***-ʊk** on the other. However, verb forms with different verb extensions which look the same synchronically can be distinguished based on comparative evidence and on the syntactic valence they display within a clause. For instance, **botoko** 'baptize' is a cognate of **bótika** 'baptize' in the East Kikongo variety Kintandu (Butaye 1909: 14) and **botika** 'soak' in several other North Kikongo varieties (Lumwamu 1974: 27), while **sekele** 'decant' corresponds to **sekula** with the same meaning in both East and North Kikongo (Butaye 1909: 240; Lumwamu 1974: 74).

This type of pervasive VH is unique within the KLC. It is well attested, however, elsewhere in West-Coastal Bantu (Guthrie 1960; Daeleman 1977), for instance in several Teke (B70) varieties, such as Iyaa (B73c), an immediate neighbour of Kibembe. In Iyaa, all root vowels (and not only mid-vowels) trigger full assimilation of the remaining vowels in the verb stem, including the verb's final vowel, as seen in (11). In other Teke languages, such as the Gabonese variety described by Fontaney (1984), only root mid-vowels trigger VH on all other vowels within the verb stem, similarly to what happens in Kibembe, as shown in (12).

(11)   Total pVH in Iyaa (B73c) (Mouandza 2001: 399ff)

ù-lìl-ìl-ì	'pleurer pour qqn'	(to weep for someone)
ù-kèl-èl-è	'couper les légumes pour qqn'	(to cut vegetables for someone)
ù-sàl-àl-à	'travailler pour qqn'	(to work for someone)
ù-kòs-òl-ò	'écraser'	(to crush)
ù-bút-ús-ù	'faire accoucher'	(to make give birth)

(12)   Total pVH in Teke (B70) (Fontaney 1984)

gá-sél-èg-è	'to arrange'
gá-kól-òg-ò	'to lie down'
gá-yàl-àg-à	'to sing'
gá-yís-ìg-à	'to teach'
gá-dùm-ùg-à	'to fly'

Given the uniqueness of total pVH within the KLC and its structural resemblances with VH elsewhere in West-Coastal Bantu, Kibembe very likely acquired this specific feature through contact with neighbouring Teke languages. This is not surprising given that the Bembe people have indeed been considered as the '*trait d'union*' between the Kongo and the western Teke (Soret 1959: 3). According to Guy Kouarata (p.c.), total pVH does not occur in all varieties of Kibembe.[9] This uneven spread of total pVH across Kibembe varieties is well in line with a hypothesis of contact-induced change. Probably not all varieties of Kibembe were equally exposed to Teke influence.

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9 This is the reason why Kouarata (2016) often provides alternative verbs forms in his dictionary, for example among others for some of the verbs cited in (10), **heembila** 'winnow' instead of **heembele** or **holisa** instead of **holoso** 'make cold'.

2.5 Irregularly occurring pVHH

Another type of pVHH, which we call irregularly occurring pVHH (shortened to 'irregular pVHH'), is attested in the West Kikongo variety spoken in the former kingdom of Kakongo (partly in the present-day Cabinda) in the eighteenth and nineteenth centuries. The second-oldest dictionary within the KLC originates from this area and was initially composed, in all likelihood, by the French missionary Jean-Joseph Descourvières, probably in 1768–1769, during his stay at the Catholic French Holy Ghost and Sacred Heart mission in Kakongo (now Landana).[10] The data in (13) show that in the Kakongo variety of West Kikongo front and back extension vowels lower after both front and back root mid-vowels: instances of root vowels **e** or **o** followed by an extension containing either **e** or **o** occur in (13). However, **lel-ol-a** 'cook manioc' is the only extended verb in the dictionary manuscript attesting a sequence of root vowel **e** followed by extension vowel **o**.

(13)   Instances of pVHH in 18th c. West Kikongo from Kakongo (1772–1773)
　　　a. Applicative (default form **-il**)
　　　tek-el-a　　　'prévoir'　　　　　　　　　(provide)
　　　b. Impositive (default form **-ik**)
　　　lemb-ek-a (1x)　'frotter avec q.ch.'　　　(rub with something)
　　　bel-ek-a　　　'arranger; préparer'　　　(arrange, prepare)
　　　somb-ek-a (2x)　'héberger; loger; louer'　(shelter, host, rent)
　　　vot-ek-a　　　'étrangler avec une fiscelle'　(strangle with a string)
　　　c. Separative (intransitive) (default form **-ul**)
　　　lel-ol-a　　　'cuire (du manioc)'　　　(cook manioc)
　　　bot-ol-a (8x)　'amoindrir'　　　　　　(lessen)
　　　tomb-ol-a　　'abaisser'　　　　　　　(lower)
　　　vok-ol-a　　　'chatrer'　　　　　　　(castrate)

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10 The original French-Kakongo and Kakongo-French dictionary manuscripts are no longer available (van Bulck 1954; Drieghe 2014). However, several slightly younger copies are still available, such as the French-Kikongo manuscript made by Pierre Belgarde in 1772 (manuscript nº 33779 of the British Library in London), which Sharah Drieghe fully digitized as part of her MA research, together with fragments of the French-Kikongo manuscript made by R.F. Cuénot in 1773 (manuscript nº 525 of the municipal library of Besançon). The French-Kikongo database, made by means of the lexicographic software TshwaneLex (Joffe and de Schryver 2002–2018), was reversed into a Kikongo-French database with the help of Gilles-Maurice de Schryver and systematically perused with the aim of identifying extended verbs manifesting pVHH.

At the same time, the eighteenth-century West Kikongo dictionary incorporates many verbs, as those in (14), which could have undergone pVHH but do not. Different possible instances of root vowels **e** or **o** followed by an extension containing either **i** or **u** are attested. Some of these verbs, i.e. **lembika, sombika, botula**, are also listed in (13), but the non-harmonized variant occurs always more frequently in the dictionary manuscript than its harmonized equivalent. The number of occurrences for each variant is indicated in parentheses.

(14)   Absence of pVHH in 18th c. West Kikongo from Kakongo (1772–1773)

a. Applicative (default form **-il**)

teb-il-a	'couper du bois'	(cut wood)
kek-il-a	'jaboter'	(jabber)
tet-il-a	'couper du bois'	(cut wood)

b. Impositive (default form **-ik**)

lemb-ik-a (6x)	'frotter avec q.ch.'	(rub with something)
tent-ik-a	'ajouter, augmenter'	(add, increase)
tomb-ik-a	'mettre en haut'	(put high)
song-ik-a	'éveiller'	(awaken)
somb-ik-a (8x)	'héberger; loger; louer'	(shelter, host, rent)

c. Separative (intransitive) (default form **-uk**)

vemb-uk-a	'blanchir'	(whiten)
bot-uk-a	'sortir, débarquer'	(exit, disembark)
son-uk-a	'dépouiller de ses feuilles/fleurs'	(lose one's leaves or flowers)
tont-uk-a	'honorer une fétiche'	(honour a fetish)
lend-uk-a	'défaillir; évanouir'	(faint)

d. Separative (transitive) (default form **-ul**)

bel-ul-a	'guérir'	(cure)
vem-un-a	'souffler'	(blow)
tek-ul-a	'verser'	(pour)
bot-ul-a (114x)	'amoindrir'	(lessen)

The distribution of pVHH in the eighteenth-century West Kikongo dictionary from Kakongo is summarized in Table 2.

As shown in Table 2, a total number of 201 different verb stems including an extension fulfil the right conditions to potentially manifest pVHH; 67 (1/3) of them have **e** as root vowel, 134 (2/3) have **o**. Only 50 of those 201, i.e. about one quarter, manifest pVHH, 19 of these have **e** in the root, 31 **o**. Of all verb forms having **e** as a root vowel, about 28% undergo pVHH. Of all verb forms having **o** as a root vowel, 23% undergo pVHH. Of the 70 verbs with a

Table 2: Irregular distribution of pVHH in West Kikongo from Kakongo (1772–1773).

Extension	Occurrences	root with e		root with o		% of verbs with pVHH
		pVHH	**No pVHH**	**pVHH**	**No pVHH**	
Applicative **-il**	97	10	23	15	49	25%
Impositive **-ik**	21	3	3	3	12	28%
Causative **-is**	13	5	0	4	4	69%
Separative **-ul**	48	1	13	9	25	21%
Separative **-uk**	22	0	9	0	13	0%
Total	201	19 (9%)	48 (24%)	31 (16%)	103 (51%)	25%

back vowel extension (i.e. 48 x **-ul** and 22 x **-uk**) following a root mid-vowel, only 10 exhibit pVHH, i.e. about 14%.[11] Of the remaining 131 with a front-vowel extension following a root mid-vowel (97 x **-il**, 21 x **-ik**, 13 x **-is**), 40 exhibit pVHH, i.e. about 31%. Front-vowel extensions do not harmonize more frequently when the root also has a front vowel. 45% of the lowered front-vowel extensions follow a front root vowel, while 55% of them follow a back root vowel. Thus, it seems that in this particular variety of West Kikongo front-vowel extensions tend to harmonize more often than back-vowel extensions. In sum, there appears to be no clear phonological conditioning for the application of pVHH in eighteenth-century West Kikongo spoken in Kakongo. This variety tends to show very irregularly applied pVHH that tends to be asymmetric.

Irregularly occurring pVHH is also attested in late nineteenth-century West Kikongo spoken in the same area. From the phonological 'rules' which Carrie (1888) proposes in his 'Fiote' grammar, it can be deduced that pVHH is attested, but neither whether it is regular nor which type it is. However, a dictionary from Le Louët (1890),[12] also compiled at the Catholic French Holy Ghost and Sacred Heart mission at Landana around the same period, contains a few instances of pVHH, as shown in (26) in the Appendix, but none of a sequence of root vowel **e**

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11 This lower percentage is mainly due to the fact that the intransitive separative **-uk** never harmonizes, while its transitive equivalent **-ul** only undergoes pVHH when the root has a back mid-vowel, apart from one case, i.e. **lel-ol-a** 'cook manioc'.

12 Although this dictionary is considered anonymous and bears no mention of its author, we know that it was composed by the missionary Georges Le Louët thanks to information received by Father Roger Tabard (p.c.), the present archivist of the Spiritan Missionaries in France.

and an extension vowel **o** or of root vowel **o** and extension vowel **e**. As shown in (27) in the Appendix, most verbs in Le Louët's dictionary potentially manifesting pVHH do not.

Irregular pVHH is also attested in the West Kikongo variety Iwoyo (H16d), spoken in the former Ngoyo kingdom in Cabinda, Angola. In her PhD thesis, Mingas (1994) only provides examples of front-vowel extensions undergoing pVHH, as shown in (28a) in the Appendix. However, sequences of root vowels **e** or **o** followed by extension vowel **i** are also attested, as shown in (28b) in the Appendix. In an older Iwoyo dictionary (Anônimo 1948), instances of lowered back-vowel extensions are also found, both after front and back mid-vowels in the root. As shown in (29a) in the Appendix, the dictionary includes examples of both front- and back-vowel extensions undergoing pVHH, but pVHH does apply irregularly, as exemplified in (29b). However, a majority of the verbs with a front-vowel extension exhibit pVHH: 29 instances of a root vowel **e** followed by an extension vowel **e** vs. 3 instances of a root vowel **e** followed by an extension vowel **i** (90.6% vs. 9.4%) and 16 instances of a root vowel **o** followed by an extension vowel **e** vs. 3 instances of a root vowel **o** followed by an extension vowel **i** (84% vs. 16%). Verbs with a back-vowel extension tend to harmonize less, but still harmonize in the majority of cases: 35 instances of a root vowel **o** followed by an extension vowel **o** vs. 8 instances of a root vowel **o** followed by an extension vowel **u** (81.4% vs. 18.6%) and 25 instances of a root vowel **e** followed by an extension vowel **o** vs. 22 instances of a root vowel **e** followed by an extension vowel **u** (53.2 vs. 46.8%). This is in line with the cross-linguistic natural tendency of back vowels to be less prone to undergo VH compared to front vowels (Finley 2008).[13] In other words, irregular pVHH in twentieth-century Iwoyo is reminiscent of irregular pVHH in eighteenth- and nineteenth-centuries West Kikongo from neighbouring Kakongo, as shown in (14) above and in (26) and (27) in the Appendix, respectively. However, in twentieth-century Iwoyo, it seems more frequent in the lexicon and it tends towards symmetric pVHH, while that of Kakongo tends towards asymmetric pVHH. In closely related Ciwoyo, spoken in the extreme west of the DRC, no pVHH is attested at all.

Despite what older attestations of Iwoyo suggest, recent fieldwork in Cabinda (February-March 2018) by the first author has mostly yielded evidence for the absence of pVHH, not only in Iwoyo, but also in closely related varieties such as Ikoci and Ikwakongo, spoken just north of Iwoyo. The verbs manifesting pVHH in the Iwoyo dictionary (Anônimo 1948) were tested in these current-day

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13 See also footnote 7 above.

varieties and pVHH turned out to be completely absent, as can be seen in (30) in the Appendix.

Finally, irregular pVHH is also observed in the two easternmost South Kikongo varieties, i.e. Dihungu and Kitsootso, both spoken in the Uíge Province of Angola. No evidence of pVHH can be found in the very few relevant examples in the available sources for these languages. Atkins (1954) mentions three Dihungu verb forms, all missing pVHH: **hond-il-a** 'kill with', **song-il-a** 'show to', **yend-is-a** 'drive'. Baka (1992) cites four Kitsootso forms also lacking pVHH: **hóh-íl-á** 'speak about', **ték-ík-á** 'bend (tr.)', **téng-ìk-a** 'incline, bend (tr.)', **lék-ís-à** 'make sleep'. However, as shown in (31) and (32) respectively of the Appendix, the field data gathered by the first author in 2015 for both languages do contain irregular traces of pVHH.[14]

2.6 No pVHH

In other parts of the KLC, none of the types of pV(H)H described in the preceding sections is attested. None of the varieties in the East Kikongo and Kikongoid subgroups lower extension vowels following mid-vowels (front or back) in the root.

The best-documented East Kikongo variety is Kintandu (H16g). Data from Butaye (1909) generally provide evidence for the absence of pVHH, i.e. 'no pVHH', as shown in (15).[15]

(15) Absence of pVHH in Kintandu (Butaye 1909)
       a. Applicative (default form **-il**)
       geg-il-a   'souffler sur'   (blow on)
       kot-il-a   'entrer dans, avec'   (enter in, with)

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14 It should be noted that present-day speakers of both languages also speak Kisikongo, Angola's main Kikongo variety and the language of mass media. Given that symmetric pVHH is perfectly regular in Kisikongo (cf. supra), it is not unlikely that the irregular-pVHH pattern in current-day Dihungu and Kitsootso is contact-induced.

15 The Kikongo-French part of the bilingual Butaye (1909) dictionary has 3,254 verbs in the macrostructure of which 598 verbs are relevant for pVHH. Only 17 verbs exhibit pVHH, just 4 of which do not have an equivalent not manifesting pVHH, i.e. **lél-ek-a, yomb-ok-a, biok-ok-a** and **bot-ok-a**. Certain other forms showing pVHH are said to originate in 'Bas-Kikongo', with which Butaye designates Kikongo as spoken on the left shore of the Inkisi River in contrast to 'Haut-Kikongo' (viz. Kintandu) spoken on the right shore (Butaye 1909: vii). Hence, the few exceptions to Kintandu's 'no pVHH' pattern, illustrated in (15), are due to contact-induced influence from Bas-Kikongo or Kindibu.

b. Impositive (default form **-ik**)

send-id-ik-a	'pencher'	(lean)
som-ik-a	'enfoncer, insérer'	(sink, insert)

c. Causative (default form **-is**)

yed-is-a	'faire mûrir, faire grandir'	(ripen, make grow)
dok-is-a	'faire claquer'	(make slam)

d. Separative (intransitive) (default form **-uk**)

bél-uk-a	'guérir, se remettre de maladie'	(recover)
somp-uk-a	'être mariée'	(be married)

e. Separative (transitive) (default form **-ul**)

bémb-ul-a	'mépriser'	(despise)
gog-ul-ul-a	'répéter'	(repeat)

PVHH appears to be absent too in the remaining East Kikongo varieties, i.e. Kimbata, Kimbeko and Kinkanu (H16h) (Bafulakio-Bandoki 1977; Lukanda 1990; Mampasi Kiyangika 2003; Nkey Iziasuma 2004; KongoKing fieldwork 2012).

As for Kikongoid, Hyman (1999: 259) already showed on the basis of data from Ruttenberg (1971) that in Kiyaka (H31) "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**." Such is the case in the closest relatives of Kiyaka (H31), i.e. Kisuku (H32) and Kisamba (L12a), as illustrated in (34) and (35) in the Appendix.[16]

The same holds true for the northern West Kikongo varieties belonging to Guthrie's B40 group, such as Yisangu (B42) (Ondo-Mébiame 2000), Yipunu (B43) (Bonneau 1956; Nsuka-Nkutsi 1980), and Yilumbu (B44) (Mavoungou and Plumel 2010), as illustrated in (36) in the Appendix.

The pVHH pattern is also absent from several West Kikongo varieties spoken further south (Guthrie's H10 group), such as the different varieties of Civili from Gabon and Congo-Brazzaville (Ussel 1888; Marichelle 1902; Hyman 1999; Mabiala 1999; I.LA.LOK 2008), Cilinji from Cabinda (fieldwork 2018 by the first author) and Kiyombe from Congo-Kinshasa (H16c), as illustrated in (37) in the Appendix. Kiyombe, spoken in Congo-Brazzaville, also lacks pVHH (Hyman 1999: 263; Mabiala 1999). Within West Kikongo, pVHH is also absent in the Cisundi variety spoken in Cabinda (Futi 2012 and fieldwork 2018 by the first

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16 The relevant data that could be found in available sources (Takizala 1974; Kasuku-Kongini 1984; Bostoen and Koni Muluwa 2011) for Hungan (H42), also a Kikongoid variety, are too few and far between to be exploited here.

author) and in the Kisundi (H131) variety spoken in the Kimongo area of Congo-Brazzaville bordering Cabinda (Hyman 1999: 263–264; Mabiala 1999).[17] The Kisundi data in N'landu Kitambika (1994), shown in (38) in the Appendix, confirm the 'no pVHH' pattern also identified by Mabiala (1999), notwithstanding some exceptions: **kù-bòk-él-à** 'appeler' (to call), **kù-dòk-òm-á** 'gargouiller' (to gurgle) and **kù-lòmb-òl-á** 'dormir' (to sleep).

The North Kikongo variety Kihangala (H111) documented by Nkouanda (1997) also lacks pVHH, as shown in (39) in the Appendix, notwithstanding some minor exceptions such as **lòngèsá** 'enseigner' (teach), **lòŋgòká** 'étudier' (study), **yòmbòká** 'enjamber' (stride over), **zèlòká** 'rouiller' (rust), **tòlòlá** 'percer, égorger' (pierce, slit throat), **kònòná** 'diminuer' (diminish). KongoKing fieldwork data gathered by Guy Kouarata in 2016 confirm this pattern (see also Hyman 1999: 263; Mabiala 1999). In the closely related North Kikongo variety Kikunyi (H13), pVHH is also absent. However, as illustrated in (40) in the Appendix, root mid-vowels seem to be copied at the end of the verb for reasons that are unclear to us.

Within Central Kikongo, pVHH is absent in Kimanyanga (H16b) as recorded in Laman (1912) and Makokila Nanzanza (2012), as illustrated in (41) in the Appendix.

3 The historical interpretation of pVHH in the KLC

Using the Comparative Method for linguistic reconstruction is an up-stream approach. From the (near-)synchronic variation observed amongst (near-)contemporary languages one attempts to reconstitute (features of) an unknown ancestor language. It is "an analytical process that 'undoes' the processes of change and posits earlier [...] structures" (Koch 2014: 286).

Table 3 presents the variation observed within the KLC in terms of pVHH patterns. As a matter of fact, it abstracts from the time depth of more than 350 years (i.e. between 1652 and today) within our dataset. This should not be considered problematic, since the kind of pVHH observed in seventeenth-century South Kikongo, i.e. symmetric pVHH, is exactly the same as the one attested in its direct descendant still spoken today in the vicinity of Mbanza

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17 In terms of phylogenetic classification, this Kisundi-Kimongo variety straddles North Kikongo and West Kikongo. While it belongs to the former in the family tree presented by de Schryver et al. (2015), it clusters with the latter in a new one including many more West Kikongo varieties (Bostoen and de Schryver 2018a).

Table 3: Distribution of the pV(H)H patterns within the KLC, showing the varieties discussed in this article.

WEST KIKONGO		EAST KIKONGO		NORTH KIKONGO	
YISANGU	NO	KINTANDU	NO	KIKUNYI	NO
YIPUNU	NO	KINKANU	NO	KIBEMBE	TOTAL/NO
YILUMBU	NO	KIMBEKO	NO	KIDONDO	BACK
CIVILI	NO	KIMBATA	NO	KIKAMBA	BACK
KIYOMBI	NO	**CENTRAL KIKONGO**		KISUNDI	BACK
KIYOMBE	NO	KIMANYANGA	NO	KIHANGALA	NO
KISUNDI	NO	KINDIBU	SYM	CILAADI	SYM
CILINJI	NO	**SOUTH KIKONGO**		KILAADI	NO
IKOCI	NO	NORTHERN KISOLONGO	ASYM	KILAARI	IRREG
IKWAKONGO	NO	SOUTHERN KISOLONGO	SYM	**KIKONGOID**	
CISUNDI	NO	KISIKONGO	SYM	KISAMBA	NO
KAKONGO (18 C.)	IRREG	KIZOMBO	SYM/IRREG	KIYAKA	NO
IWOYO (20 C.)	IRREG				
IWOYO (21 C.)	NO	KITSOOTSO	IRREG	KISUKU	NO
CIWOYO	NO				

Kongo. Similarly, pVHH was irregular in the eighteenth-century West Kikongo variety spoken in Kakongo as still was the case one century later in the same variety and two centuries later in the Iwoyo variety spoken in neighbouring Ngoyo. By contrast, irregular pVHH is no longer observed in Cabinda today. So, while some pVHH patterns within the KLC did change over the last few centuries, the types already attested in the oldest sources did not disappear entirely.

In order to facilitate the diachronic interpretation of pVHH patterns within the KLC, the comparative evidence in Table 3 is not clustered according to types of pVHH, but following the phylogenetic subgroups identified in de Schryver et al. (2015). Although the internal genealogical relationships between the different subgroups need further clarification, each one of them – except Central Kikongo – can be considered to be a solid and discrete genealogical unit descending from a most recent common ancestor that is not shared with the other subgroups. The same holds true for the KLC as a whole as opposed to the remainder of West-Coastal Bantu.

Following Weiss (2014: 129), who points out that "the optimal reconstruction seeks to maximise parsimony and naturalness", one is led to posit that neither Kikongoid nor East Kikongo had pVHH. This assimilatory phenomenon is completely absent from both subgroups. The same holds for the most recent common ancestor of Kiyombi, Civili and the B40 languages Yisangu, Yipunu

and Yilumbu, which de Schryver et al. (2015: 140) claim to be more closely related amongst each other than with the rest of West Kikongo. If we posited the existence of some kind of pVHH in Proto-Kikongo, this would imply that: (i) each of these subgroups lost it independently; or (ii) it was lost once in a most recent common ancestor which they share amongst each other but not with the remainder of the KLC. The first scenario is no doubt not the most parsimonious. The second one faces several challenges. The most important one is that Kiyombi, Civili and the B40 languages are known to be more closely related with the other West Kikongo languages, where pVHH was not entirely absent, than with East Kikongo and Kikongoid. Moreover, in spite of their geographical closeness, no specific evidence points towards a closer genealogical relatedness between Kikongoid and East Kikongo. Quite the opposite, de Schryver et al. (2015: 140) assume that Kikongoid – as its name suggests – branched off first before the rest of the KLC – or 'core Kikongo' as they call it – started to diverge. Moreover, Bostoen and de Schryver (2018b) provide further phylogenetic evidence that within 'core-Kikongo', East Kikongo is most closely related to South Kikongo. Additionally, reconstructing some type of pVHH to Proto-Kikongo would also imply that within most of the subgroups where pVHH does occur in certain languages, others would have lost it after their most recent common ancestor started to split into daughter languages. Within North Kikongo, Kihangala and Kikunyi as well as certain varieties of Cilaadi and Kibembe miss pVHH entirely. It is also absent from Kimanyanga, which de Schryver et al. (2015: 144) describe as an "initially northern variety". Among the southernmost West Kikongo varieties, pVHH is absent today from Ciwoyo, Iwoyo, Cisundi, Ikwakongo, Ikoci and Cilinji. Even within South Kikongo, where pVHH is most prolific, it is not excluded that the easternmost varieties Dihungu and Kitsootso, where pVHH is very irregular, acquired it through contact-induced influence from the principal South Kikongo variety spoken in the vicinity of Mbanza Kongo. Considering the counterarguments to the second scenario, it seems to be more parsimonious to conclude that the 'no-pVHH pattern' is a shared retention inherited from Proto-Kikongo, while the different types of pVHH are later innovations.

One strong argument in favour of considering pVHH as an innovation is the fact that the different subgroups in which it occurs have distinct types of pVHH. This suggests that pVHH of different types might have emerged independently in each subgroup. Symmetric and asymmetric pVHH are mainly attested in South Kikongo, including Kindibu, which probably has its genealogical origins in that subgroup (de Schryver et al. 2015: 144; Bostoen and de Schryver 2018b). In North Kikongo, symmetric pVHH only occurs in Cilaadi, but not in all its varieties. The most widespread type of pVHH in North Kikongo is back pVHH. This type is not

only typologically odd – because back vowels universally tend to be poorer VHH undergoers than front vowels (Finley 2008) – but also structurally quite distinct from common Bantu (a)symmetric pVHH. Back pVHH is conditioned by a frontness/backness distinction in the verb extension vowels undergoing harmony. By contrast, common Bantu asymmetric pVHH results from a frontness/backness distinction in the root vowels triggering the harmony. In other words, it is hard to imagine how back pVHH and (a)symmetric pVHH could be derived from a shared ancestral stage. Neither symmetric pVHH nor asymmetric pVHH can parsimoniously or naturally result from back pVHH or the other way around. However, asymmetric pVHH as attested in northern Kisolongo can quite easily evolve into symmetric pVHH as attested in Kisikongo, Kizombo and southern Kisolongo. Given that back vowels tend to harmonize less commonly than front vowels in the world's languages, it is not unexpected that if back vowels in verb extensions harmonize, they first harmonize following root back-vowels only as in northern Kisolongo (and most other Bantu 5V languages) and only later following root front-vowels. Based on these arguments, we propose that (a)symmetric pVHH as found elsewhere in Bantu is an independent innovation in South Kikongo. This innovation started out as asymmetric pVHH, retained in northern Kisolongo, and further evolved into symmetric pVHH elsewhere. Symmetric pVHH as attested in Cilaadi is either also an independent development or the outcome of contact-induced change under the influence of South Kikongo. The fact that some Cilaadi varieties have symmetric pVHH while other Cilaadi varieties do not or have it only irregularly is an argument in favour of the second scenario. Moreover, Cilaadi is the only North Kikongo language featuring non-systematic noun prefix reduction, a phonological innovation that has been shown to have spread across parts of the KLC through contact (Bostoen and de Schryver 2015: 147). Hence, pVHH is in all likelihood not an independent evolution in Cilaadi, but a contact-induced innovation suggesting that ancestral Cilaadi speakers would have had stronger interaction with South Kikongo speakers than with speakers of other North Kikongo varieties.

The fact that pVHH occurs irregularly and without a clear phonological conditioning in so many different KLC varieties suggests that language contact must indeed have played a role in the spread of this phonological innovation. Even within South Kikongo, where (a)symmetric VHH is most prolific, it is irregular in the easternmost languages, i.e. Dihungu, Kitsootso and Kizombo. This points to the fact that, even within South Kikongo, asymmetric pVHH cannot be reconstructed to the subgroup's most recent common ancestor. Rather, asymmetric pVHH is a later innovation within ancestral Kisikongo and Kisolongo, which subsequently diffused to other South Kikongo varieties through contact.

This process of contact-induced spread probably did not stop at the borders of South Kikongo.

Map 1 shows that all languages having asymmetric pVHH, symmetric pVHH or some kind of irregular pVHH cluster geographically, i.e. they are all located in the southern part of the KLC. On the other hand, the languages further east and north lack pVHH, except those North Kikongo varieties which independently developed a structurally unrelated type of pVHH. The most conservative languages with regard to pVHH are manifestly geographic outliers in comparison to those having pVHH of some kind and especially to those having (irregular) (a)symmetric pVHH. This geolinguistic pattern is typically the outcome of a process of dialectal diffusion, whereby a change that is initiated in the centre of innovation or focal area gradually spreads to adjacent regions and peters out in peripheral areas (Andersen 1988). It is striking that all languages having some kind of irregular pVHH are situated in the periphery of the (a)symmetric pVHH heartland. In all these languages, irregular pVHH can be considered to be a kind of imperfectly acquired (a)symmetric pVHH, which further corroborates the hypothesis of contact-induced transmission.

As extensively argued in Bostoen and de Schryver (2015), noun prefix reduction is another linguistic innovation that spread from a South Kikongo focal area coinciding with the heartland of the Kongo kingdom to other parts of the KLC. Its contact-induced dialectal diffusion was facilitated through the processes of political centralization and economic integration that took place within the realm of that polity. The contact-induced spread of this feature is not simply determined by the geographical vicinity of varieties to the South Kikongo core area, but also by the way the speakers of these varieties interacted with the South Kikongo speakers both economically and politically. This may account for the fact that irregular pVHH was attested, for instance, in the West Kikongo varieties spoken in the coastal kingdoms of Ngoyo and Kakongo, which entertained intensive trade and cultural exchanges with South Kikongo speakers, but not in West Kikongo varieties geographically closer to South Kikongo, such as Ciwoyo, Kiyombe, Cisundi and Kisundi-Kimongo, spoken in the more enclaved/secluded Mayombe forest area. The more recent loss of (irregular) pVHH in languages from Cabinda spoken in the former kingdoms of Ngoyo and Kakongo might have to do with the fact that this contact with South Kikongo speakers is currently much less intensive, if not almost non-existent.

Irregular pVHH occurs in West Kikongo also in verb forms that do not exist in the core South Kikongo variety. This fact suggests that this pattern is not simply the outcome of lexical borrowing through commercial and/or cultural contacts. Speakers of West Kikongo or eastern South Kikongo varieties attesting irregular pVHH did not just borrow South Kikongo verbs that underwent pVHH.

They apparently copied the Kisikongo pVHH pattern and applied it to all kinds of verb forms, though imperfectly. For example, of the eighteenth-century West Kikongo verbs in (13) showing pVHH, the following were attested in neither Van Gheel (1652) nor Bentley (1887): **bel-ek-a, somb-ek-a, lel-ol-a** and **bot-ol-a**. This suggests that these verb forms are found only in West Kikongo. On the other hand, several eighteenth-century West Kikongo verb forms not displaying pVHH, such as **kek-il-a, lemb-ik-a, vemb-uk-a** and **vem-un-a**, do have cognate verb forms undergoing pVHH in both seventeenth- and nineteenth-centuries South Kikongo from Mbanza Kongo. Such examples indicate that West Kikongo verb forms undergoing pVHH are not the result of lexical borrowing. Rather, they suggest that speakers of these West Kikongo varieties wished to talk like people from Mbanza Kongo, for reasons of prestige, by trying to incorporate pVHH in their own speech, but did not succeed to do so regularly. The loss of irregular pVHH may be accounted for by the fact that today Kikongo speakers from Cabinda are inclined to see themselves distinctly and independently from other Angolans, including South Kikongo speakers. Many of them do not even consider themselves as speakers of Kikongo (António 2016; fieldwork 2018 by the first author).

The case of the North Kikongo variety Kibembe from Congo-Brazzaville, which acquired a very distinctive type of total pVH, is another piece of evidence indicating that language contact may indeed underlie the spread of vowel harmony. The centre of innovation was not situated in this case in the Kongo kingdom with southern Kikongo as its principal language, but in the neighbouring Tio kingdom that was home to the Teke (B70) languages (Vansina 1973).

Finally, the fact that a small cluster of North Kikongo languages (Kidondo, Kikamba, Kisundi) developed the back-pVHH pattern independently from the South Kikongo languages shows that even a type of pVHH that is uncommon from a typological point of view may emerge in parallel to more common types such as symmetric and asymmetric pVHH.

4 Conclusions

Progressive vowel height harmony (pVHH) cannot be reconstructed to Proto-Kikongo, the most recent common ancestor of the KLC languages. We come to this conclusion through a bottom-up approach consisting of a systematic comparison of the different types of pVHH attested within this group of closely related languages. The reconstruction of the no-pVHH pattern into Proto-Kikongo is the most parsimonious and natural way to explain the variation

observed within this sub-branch of West-Coastal Bantu, taking into account its internal phylogenetic structure. This hypothesis posits the least amount of changes to be undone in order to reach the putative ancestral point of departure. The (a)symmetric-pVHH and back-pVHH patterns, the two main and structurally distinct kinds of pVHH within the KLC, emerged independently within two distinct subgroups, viz. South Kikongo and North Kikongo respectively. Both types emerged relatively late in the history of the KLC, i.e. after South Kikongo and North Kikongo started to diverge.

The (a)symmetric-pVHH pattern started out as asymmetric pVHH in the most recent common ancestor of Kisolongo and Kisikongo. This must have happened before the seventeenth century oldest attestations of Kikongo (which are also the oldest for any Bantu language). In the seventeenth century South Kikongo sources from Mbanza Kongo (Angola), asymmetric pVHH had already evolved into symmetric pVHH. The archaic asymmetric-pVHH pattern itself had only been retained in one specific variety of South Kikongo, i.e. late nineteenth-century Kisolongo spoken north of the Congo River, while it had already evolved into symmetric pVHH in early-twentieth-century Kisolongo spoken south of the Congo River. This shows how data from one specific variety can be key to our understanding of how language evolves and pleads for solving historical-linguistic puzzles with the help of data from as many different varieties as possible. Back pVHH most likely emerged in the most recent common ancestor of Kidondo, Kikamba and Kisundi from Mboko-Songho, the only North Kikongo varieties to share this typologically uncommon innovation. This fact suggests that these varieties are more closely related amongst each other than with the rest of North Kikongo.

The two other types of pVHH, i.e. total pVH and irregular pVHH, did not emerge independently at the stage of some ancestral language to be subsequently transmitted to their daughter languages. The present-day distribution of these two types of harmony within the KLC is the outcome of contact-induced change. The North Kikongo variety Kibembe acquired the total-pVH pattern through the influence of Teke languages spoken in the neighbouring kingdom of Tio. The irregular-pVHH pattern found in certain West Kikongo varieties results from the imperfect acquisition of the (a)symmetric-pVHH pattern to which languages from different subgroups were exposed, in all likelihood due to more or less intensive exchanges these speakers had with South Kikongo speakers from the Kongo kingdom. Given that the phonological change of noun prefix reduction spread from the same focal area, it becomes more and more clear that the heartland of the illustrious polity centred around the capital of Mbanza Kongo once constituted an important centre of linguistic innovation, especially during the seventeenth and eighteenth centuries.

Although the language data considered in this article are limited to a very specific Bantu subgroup, our historical interpretation of how pVHH developed within the KLC possibly has relevance for the reconstruction of this phonological feature at deeper Bantu time levels. The comparative evidence from the KLC presented in this article indicates that both asymmetric and symmetric pVHH, just like less common Bantu types of pVHH, may emerge independently in different Bantu subgroups. If symmetric pVHH cannot be reconstructed to Proto-Kikongo and was indeed a later innovation that was only regularly inherited by seventeenth-century South Kikongo and its direct descendants, should it then be reconstructed to Proto-Bantu? In line with Hyman (1999), our answer to this question would be no. If distinct kinds of pVHH could develop within a group of closely related languages like the KLC, including a cognitively unnatural one like back pVHH, it does not seem unreasonable to assume that the more natural (a)symmetric-pVHH patterns may have recurrently developed as parallel innovations within the Bantu family. Relying on Kikongo evidence only, our conclusion would be that Proto-Bantu had neither symmetric nor asymmetric pVHH. The current-day distribution of both pVHH patterns across Bantu are likely the outcome of later innovations.

Our historical analysis of pVHH patterns within the KLC thus confirms Hyman's (1999) reconstruction of no-pVHH pattern in Proto-Bantu. As stated in the introduction, Hyman (1999) reaches this original conclusion by developing an alternative theory to account for the differential pVHH realization of derivational suffixes across Bantu. He reconstructs some of the Bantu verb extensions with a third-degree vowel, i.e. applicative ***-ed** (instead of ***-ɪd**) and neuter/stative ***-ek** (instead of ***-ɪk**), as opposed to others which keep their original second-degree vowel, i.e. causative ***-ɪc-i**, separative/reversive intransitive ***-ʊk**, and separative/reversive transitive ***-ʊd**. With suffixes having a back vowel, pVHH would then involve the lowering of *ʊ to a third-degree (mid) vowel in the presence of a third-degree root (mid-)vowel, either **o** in the case of asymmetric pVHH, or **e** and **o** in the case of symmetric pVHH. However, with suffixes having a front vowel, pVHH would not involve vowel lowering, as traditionally assumed, but the raising of *e to a second-degree vowel by a process of so-called "peripheralization", triggered by all root vowels except root mid-vowels *e and *o (as well as by *a in parts of zones K and R). The comparative evidence from the KLC considered in this article suggests that the alternative explanation proposed by Hyman (1999) is an unnecessary complication. The 'no-pVHH' pattern can be reconstructed in Proto-Bantu without the need to reconstruct Proto-Bantu derivational suffixes with vowels of different heights.

In our view, pVHH is so often asymmetric in the front vs. back series, not because of a difference in starting point (***-ed** and ***-ek** would begin as third-degree vowel extensions, while ***-ʊk** and ***-ʊd** as second-degree vowel

extensions), as Hyman (1999: 288) assumes; rather, the asymmetry can likely be explained by the natural tendency of back vowels to be poorer VHH undergoers than front vowels due to a strong cognitive bias. The fact that the historically complex Bantu causative suffix ***-ɪc-i** is less prone to pVHH in Bantu languages than the applicative ***-ɪd** and the neuter or impositive ***-ɪk** is probably linked to the presence of a first-degree vowel (i.e. ***i**) in ***-ɪc-i**. The presence of ***i** either prevented pVHH from spreading to the initial second-degree vowel ***ɪ**, or caused the anticipatory raising of the causative's initial vowel, as proposed by Guthrie (1970: 219), which was then no longer a possible target for pVHH.

In the KLC there is no evidence that Proto-Bantu would have had ***-ed** and ***-ek** extensions with third-degree vowels as opposed to ***-ʊk** and ***-ʊd** extensions with second-degree vowels. If this were the case, one would expect to find 'no pVHH' languages where the present-day reflexes of ***-ed** and ***-ek** did not undergo "peripheralization" and have a mid-vowel, viz. being **-el** and **-ek**, following any kind of root vowel. Such languages do not exist within the KLC. Front vowels in verb extensions not undergoing pVHH always reflect a Proto-Bantu second-degree vowel, just like in verb extensions with back vowels. In the absence of pVHH, the applicative and neuter extensions are then always realized as **-il** and **-ik**, respectively, and never as **-el** and **-ek**. Similarly, the separative extension is always realized as **-ul** and **-uk** when pVHH does not apply. As a consequence, there is no need, in our view, to reconstruct derivational suffixes with third-degree vowels in Proto-Kikongo, and not in Proto-Bantu either.

This brings us to the final question of whether Proto-Kikongo was a Bantu 5V or 7V language. Hyman (1999: 264–265) speculates that the development of symmetric pVHH in Kikongo – or more correctly in some Kikongo varieties – was set in motion at a point when the ancestral language still had 7V. He assumes so because certain South Kikongo varieties stand out within Bantu as the only 5V languages having symmetric pVHH. All other Bantu languages attesting symmetric pVHH have 7V systems. As we have argued in this article, symmetric pVHH is a late innovation within one specific subgroup of the KLC, viz. South Kikongo. It cannot be reconstructed to Proto-Kikongo. Does this imply that ancestral Kikongo varieties kept the inherited Proto-Bantu 7V system until relatively late in their evolution or should we assume that pVHH and 7V > 5V reduction are two phonological innovations that took place independently within the KLC? It is difficult to answer these questions conclusively, especially because all verb extensions with front vowels behave identically with regard to pVHH. If causative **-is** had not been targeted by pVHH, while applicative **-il** and impositive or neuter **-ik** were, one could have argued that pVHH developed while South Kikongo still had 7V and that ***-is** (<***ɪc-i**) was exempted because it had a first-degree vowel as opposed to ***-ɪl** and ***-ɪk** which

had second-degree vowels. However, this is not the case. So, pVHH may have developed within South Kikongo when it still had 7V and these extensions all had a second-degree front vowel, or after ancestral South Kikongo had already merged first-degree and second-degree vowels and had become a 5V language. Since all present-day languages within the KLC have 5V – except Kihungan which redeveloped 7V at a later stage (Bostoen and Koni Muluwa 2011) – it seems most plausible and economical to reconstruct 5V for Proto-Kikongo, their most recent common ancestor. This shift from Proto-Bantu 7V to Proto-Kikongo 5V would then be a shared innovation, which further corroborates the genealogical unity of the KLC within West-Coastal-Bantu. Given the large vowel inventories of the West-Coastal Bantu languages outside the KLC (Daeleman 1977; Rottland 1977; Koni Muluwa and Bostoen 2011, Koni Muluwa and Bostoen 2012), Proto-West-Coastal Bantu probably still had 7V. However, as we have argued elsewhere (Goes and Bostoen 2017), apart from pVHH patterns, the irregular application of Bantu Spirantization within the KLC is maybe another indication that Proto-Kikongo actually was a 7V language and that 7V > 5V reduction was an independent convergent innovation that occurred repeatedly after the KLC's initial branching into different subgroups, as it did elsewhere in Bantu.

Appendix: Additional evidence for pVHH types within the KLC (see also Section 2)

1 Symmetric pVHH

(16) Symmetric pVHH in South Kikongo from San Salvador (now Mbanza Kongo) (Bentley 1887)

mon-ek-a	'appear'
lemb-ek-a	'appease'
tomb-ok-a	'ascend'
vemb-ok-a	'go aside'
lomb-ol-a	'blacken'
kosom-on-a	'break to atoms'

(17) Symmetric pVHH in Kisikongo (H16a) (Ndonga Mfuwa 1995)

vóv-èl-à	'parler pour/au nom de'	(speak for)
vónd-èl-à	'tuer pour'	(kill for)
nón-èn-à	'ramasser pour'	(pick up for)
lémb-èk-à	'adoucir'	(soften)
nyóng-ón-òk-à	'se plaindre'	(complain)
lómb-ól-òl-à	'barboter'	(paddle, splash)
zyóng-òn-à	'pincer avec les ongles'	(pinch with nails)
vév-òl-à	'alléger'	(lighten)

(18) Symmetric pVHH in Kisolongo (Tavares 1915)

a. Applicative (default form **-il**)

vov-el-a	'cantar'	(sing)

b. Impositive

tel-ek-a	'levantar'	(lift, raise)

c. Causative (default form **-is**)

kol-es-a	'activar, fazer crescer'	(activate, make grow)
vov-es-a	'dizer'	(say)

d. Separative (intransitive) (default form **-uk**)

kes-ok-a	'estar quebrado'	(be broken)

e. Separative (transitive) (default form **-ul**)

kes-on-a	'quebrar'	(break)
sok-ol-a	'descarregar'	(unload)
som-on-a	'desenfiar'	(unravel)
bol-ol-ol-a	'chamar de novo'	(call again)

The only two exceptions in Tavares (1915):

zeng-uk-a	'estar cortado'	(be cut off)
tok-id-ik-a	'cansar'	(tire, fatigue)

(19) Symmetric pVHH in Kizombo as reported by Carter and Makondekwa (1987)

a. Applicative (default form **-il**)

kóomb-el-á	'sweep for'	
vóv-el-á	'talk to'	
zól-el-á	'want for'	

b. Causative (default form **-is**)

mok-és-a	'(make) talk to'	
vóv-es-á	'speak to, cause to speak'	

c. Impositive (default form **-ik**)

són-ek-à	'write'	
yond-ék-a	'steep, soak'	

d. Separative (intransitive) (default form **-uk**)

vvengóm-ok-a	'clear'
zzek-ok-a	'turn'
kkòs-ok-á	'sit down'

e. Separative (transitive) (default form **-ul**)

vév-ol-à	'relieve of burden'
teétola	'remind'

(20) Irregular symmetric pVHH in Kizombo as reported in Mpanzu (1994)

a. Applicative (default form **-il**)

ték-íl-à	'vendre pour; puiser pour'	(sell for, draw water for)	(no pVHH)
sós-íl-à	'chercher pour'	(search for)	(no pVHH)

b. Causative (default form **-is**)

sóng-ód-ìs-à	'faire aiguiser'	(make sharpen)	(partially pVHH)
sós-ís-à	'faire chercher'	(make search)	(no pVHH)

c. Impositive (default form **-ik**)

tél-ék-à	'mettre marmite sur feu'	(put the kettle on the fire)	(pVHH)
tól-ék-à	'renverser'	(overthrow)	(pVHH)
ték-ék-à	'courber'	(bend)	(pVHH)
yék-ík-à	'donner l'appui'	(give support)	(no pVHH)

d. Separative (intransitive) (default form **-uk**)

tól-ók-à	'se casser'	(break)	(pVHH)

e. Separative (transitive) (default form **-ul**)

yék-ól-à	'trahir'	(betray)	(pVHH)
tól-ól-à	'se briser'	(break, shatter)	(pVHH)

(21) Symmetric pVHH in Kindibu as reported in Coene (1960)

a. Applicative (default form **-il**)

keng-el-el-a	'épier'	(spy on)
leng-el-a	'se faner'	(fade)
bok-el-a	'appeler'	(call)
konk-el-a	's'approcher'	(approach one another)

b. Impositive (default form **-ik**)

lemb-ek-a	'calmer'	(calm down)
vwet-ek-a	'fléchir'	(flex)
tong-ek-a	'dresser'	(train)
son-ek-a	'écrire'	(write)

    c. Causative (default form **-is**)

kemb-es-a	'féliciter'	(congratulate)
pemb-es-a	'blanchir'	(whiten)
konk-es-a	'approcher'	(approach)
yot-es-a	'circonscrire'	(define, delimit)

    d. Separative (intransitive) (default form **-uk**)

lem-ok-a	'courir'	(run)
yel-ek-a	'déguster'	(taste)
long-ok-a	'apprendre'	(learn)
tomb-ok-a	'monter'	(go up)

    e. Separative (transitive) (default form **-ul**)

lemv-ol-a	'apprivoiser'	(tame)
tem-on-a	'civiliser'	(civilize)
tol-ol-a	'casser'	(break)
tob-ol-a	'trouer'	(make a hole)

(22)   Symmetric VHH in Cilaadi (Jacquot 1985)

    a. Applicative (default form **-il**)

temb-el-a	'vaciller'	(flicker)
gleb-el-a	'se baigner'	(bathe oneself)

    b. Impositive (default form **-ik**)

bond-ek-a	'mouiller'	(make wet)

    c. Causative (default form **-is**)

gleb-es-a	'baigner'	(bathe someone)

    d. Separative (intransitive) (default form **-uk**)

dek-ok-a	'être caché'	(be hidden)

    e. Separative (transitive) (default form **-ul**)

fwok-ol-a	'coucher les herbes'	(lay down the herbs)

2 Back pVHH

(23)   Absence of front pVHH in Kikamba (Bouka 1989)

    a. Applicative (default form **-il**)

kwèèl-ìl-a	'marier pour'	(marry for)
swèèk-ìl-a	'cacher pour'	(hide for)
bònd-ìl-a	'adorer'	(adore)
tòòn-ìl-a	'commencer pour'	(begin for)

    b. Impositive (default form **-ik**)

tèl-ìk-a	'metttre au feu'	(put on the fire)

   c. Causative (default form **-is**)

lèm-ìs-a	'blesser'	(injure)
dyèèng-ìs-a	'faire tourner'	(make turn)
bòl-ìs-a	'faire pourrir'	(make rot)
nók-ìs-a	'faire pleuvoir'	(make rain)

(24) Regular back pVHH in Kikamba (KongoKing fieldwork 2016 by Guy Kouarata)
     Separative (default forms of the separative suffixes are **-uk** and **-ul**)

ku-tob-ók-a	'se percer'	(to be pierced)
ku-sok-on-á	'détacher'	(to detach)
ku-tob-ol-á	'percer'	(to pierce)
ku-tel-ól-a kisá	'enlever une casserole du feu'	(to take a pot from the fire)
ku-syón-on-a	'retirer'	(to take out)
ku-kóh-ol-a	'tousser'	(to cough)

(25) Regular back pVHH in Kisundi (KongoKing fieldwork 2016 by Guy Kouarata)
     a. Separative (default forms of the separative suffixes are **-uk** and **-ul**, respectively)

ku-béél-ók-a	'se rétablir, guérir'	(to recover, heal)
kut-ob-ól-a	'percer'	(to pierce)
ku-koh-ól-a	'tousser'	(to cough)
ku-sok-ón-a lungási	'détacher une noix de la grappe'	(to detach a nut from the cluster)

     b. Applicative and causative (default forms of the applicative and causative suffixes are **-il** and **-is**, respectively)

ku-kéék-il-a	'caqueter'	(to cackle)
ku-yénd-il-a	'aller pour'	(to go for)
ku-bééd-is-a	'rendre malade'	(to make sick)
ku-bóóng-is-a	'faire prendre'	(to make take)

3 Irregularly occurring pVHH

(26) Instances of pVHH in 19th c. West Kikongo from Kakongo (Le Louët 1890)

zengh-el-el-a	'accrocher'	(hang on, hook on)
vek-esi-a	'accompagner'	(accompany)
toss-ol-a	'tousser'	(cough)
viong-ol-a	'tatouer'	(tattoo)

(27)   Absence of pVHH in 19th c. West Kikongo from Kakongo (Le Louët 1890)
       a. Applicative (default form **-il**)
       kol-il-a   'empirer'   (worsen)
       lengh-il-a   'faner'   (fade)
       b. Impositive (default form **-ik**)
       lemb-ik-a   'apaiser, caresser'   (calm, caress)
       tent-ik-a   'appliquer, superposer'   (apply, superpose)
       kol-ik-a   'corriger'   (correct)
       c. Causative (default form **-isy <issi>**)
       tok-issi-a   'faire bouillir'   (boil)
       lengh-issi-a   'obséder'   (obsess)
       d. Neuter (default form **-ik**)
       ki mon-ik-a   'apparaître, se montrer'   (appear)
       e. Separative (intransitive) (default form **-uk**)
       lel-uk-a   'cuire à moitié'   (cook half)
       los-uk-a   'beugler, crier'   (bawl, cry)
       non-uk-a   's'allonger'   (lie down)
       f. Separative (transitive) (default form **-ul**)
       song-ul-a   'acérer, appointer'   (make into a point, sharpen)
       leng-ul-a   'aiguiser'   (sharpen)
       dong-ul-a m'eno   'curer les dents'   (pick one's teeth)

(28)   Irregular pVHH in 20th c. Iwoyo (Mingas 1994)
       a. Presence of pVHH
       wènd-èl-á   'aller vers'   (go to)
       vuét-él-él-á   'puiser (intensivement)'   (draw water intensively)
       vònd-èl-à   'tuer avec'   (kill with)
       nòng-èl-á   'recueillir avec, ramasser avec' (welcome with, collect with)
       lèmb-ék-èl-á   'dormir'   (sleep)
       kòmb-èl-èl-à   'balayer (intensivement)'   (sweep intensively)
       mon-es-an-a   'se montrer l'un l'autre'   (show one another)
       zol-es-an-a   's'entre-aimer'   (love one another)
       lòng-ès-à   'aider à enseigner'   (help to teach)
       kót-ès-à   'aider à entrer'   (help/make enter)
       b. Absence of pVHH
       yob-il-a   'se baigner'   (bathe oneself)
       téb-ìl-à   'mordre'   (bite)
       tòb-ùk-à   'être troué'   (be holed)

bèl-ùl-a	'guérir'	(cure)
lés-ùl-à	'éblouir'	(dazzle)
bót-ùl-a	'soustraire'	(subtract)
tòb-ùl-à	'trouer'	(pit)

(29) Irregular pVHH in 20th c. Iwoyo (Anônimo 1948)

a. Presence of pVHH

des-ok-el-a	'criticar'	(criticize)
temb-el-a	'cincar'	(flounder)
bond-el-el-a	'implorar'	(beg)
tol-ok-el-a	'acudir'	(respond)
kol-ek-a	'habituar'	(accustom)
kond-el-ek-a	'torcer'	(twist)
vemb-ok-a	'desgarrar'	(stray)
neng-om-ok-a	'descer'	(go down)
vek-om-on-a	'soprar'	(blow)
kok-om-on-a	'induzir'	(introduce)
bot-ol-a	'omitir'	(omit)
bel-ok-a ko	'incuravel'	(incurable)
long-ok-a	'ensaiar'	(teach)
zol-ok-a	'[ser] amável'	([be] lovable)
kot-ok-a	'acordar'	(wake up)
bel-ek-a	'arrecadar'	(collect)
lemb-ek-a	'apaziguar'	(appease)
mon-ek-a	'aparecer'	(appear)
son-ek-a	'[fazer] nota[s]'	(make notes, write)

b. Absence of pVHH

bes-ul-ik-a	'emendar'	(amend)
kond-ik-a	'obstar'	(prevent)
sek-uk-a	'converter'	(convert)
tend-uk-a	'luzir'	(sparkle)
loz-uk-a	'instalar'	(click)
sens-ul-a	'inspirar'	(inspire)
kenk-un-a	'reduzir'	(reduce)
kot-ul-a	'despertar'	(awaken)

(30) No pVHH in 21th c. Iwoyo (IW), Ikwakongo (IKW) and/or Ikoci (KC)
      (Fieldwork 2018 by the first author)[18]

bot-ulw-a	'tirar'	(take away, remove) (IW, KC)
bel-ukw-a	'currar'	(cure) (IW, KC)
long-ukw-a	'apprender'	(teach) (IW, KC)
zol-ukw-a	'ser amado'	([be] lovable) (IW)
kot-ukw-a	'acordar'	(wake up) (IW, IKW)
bel-ik-a	'arrecadar'	(collect) (IW)
lemb-iky-a	'apaziguar'	(appease) (IW, IKW)
mon-ik-a	'aparecer'	(appear) (IW, IKW, KC)
son-ik-a	'escrever'	(write) (IW, IKW, KC)
konz-ulw-a	'crear individuo, elemento'	(create individual, element) (KC)
lob-ukw-a	'saltar'	(jump) (KC)

(31) Irregular pVHH in Dihungu (KongoKing Fieldwork 2015 by the first author)
      a. Applicative (default form **-il**)

bek-el-a	'esperar por'	(wait for)
song-el-a	'mostrar'	(show)
zeng-il-a	'cortar para'	(cut for)

      b. Impositive (default form **-ik**)

son-ek-a	'escrever'	(write)

      c. Causative (default form **-is**)

sow-ek-es-a	'trocar'	(exchange)
seh-es-a	'fazer rir'	(make laugh)
simb-is-a	'fazer asegurar'	(make secure)
kot-is-a	'fazer entrar'	(make enter)

      d. Separative (intransitive) (default form **-uk**)

long-ok-a	'apprender'	(learn)
tomb-ok-a	'subir'	(go down)
bel-uk-a	'voltar'	(return)

      e. Separative (transitive) (default form **-ul**)

teng-ol-a	'destampar'	(uncap)

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18 The word-final diphthongization observed in several verbs in (30) does not apply systematically. The final consonant of suffixes taking a back vowel, such as **-ul** and **-uk**, is sometimes followed by the glide **w**, while that of suffixes taking a front vowel, such as **-ik**, is sometimes followed by the glide **y**.

(32)　Irregular pVHH in Kitsootso (KongoKing Fieldwork 2015 by the first author)
　　　a. Applicative (default form **-il**)
　　zeeng-il-a　　　'cortar para'　　　　　　(cut for)
　　kwend-il-a　　　'buscar por'　　　　　　(go, search for)
　　　b. Impositive (default form **-ik**)
　　son-ek-a　　　　'escrever'　　　　　　　(write)
　　　c. Causative (default form **-is**)
　　lok-es-a　　　　'limpar'　　　　　　　　(to clean)
　　　d. Separative (intransitive) (default form **-uk**)
　　vev-ok-a　　　　'estar fácil'　　　　　　(to be easy)
　　　e. Separative (transitive) (default form **-ul**)
　　vum-un-a　　　　'grelhar, frittar'　　　　(fry)

4 No pVHH

(33)　No pVHH in Kilaadi (Dhienda 1972)
　　　a. Applicative (default form **-il**)
　　leem-in　　　　'briller pour'　　　　　　(shine for someone)
　　nook-in　　　　'être mouillé par la pluie'　(become wet by the rain)
　　　b. Causative (default form **-is**)
　　sek-ud　　　　'se faire renverser'　　　　(get knocked down)
　　kook-is　　　　'diminuer, faire descendre'　(lessen, make descend)
　　　c. Separative (intransitive) (default form **-uk**)
　　kot-uk　　　　'sortir'　　　　　　　　(go out)
　　long-uk　　　　'apprendre'　　　　　　(learn)
　　beel-uk　　　　être guéri'　　　　　　(be healed)
　　　d. Separative (transitive) (default form **-ul**)
　　tob-ul　　　　'percer'　　　　　　　　(pierce)
　　beel-ul　　　　'guérir'　　　　　　　　(heal)

(34)　Absence of pVHH in Kisuku (Dhienda 1972; Piper 1977)
　　　a. Applicative (default form **-il**; **-id** in front of **i**)
　　lek-id-il　　　'lauschen'　　　　　　　(listen)
　　komb-id-id　　'vollständig reinigen'　　　(clean intensively)
　　　b. Impositive (default form **-ik**)
　　beet-ik　　　　'klopfen'　　　　　　　(knock)
　　tet-ik　　　　'aufrecht hinstellen'　　　(place upright)
　　zemb-ik　　　　'aufhängen'　　　　　　(hang up)
　　bot-ik　　　　'taufen, segnen'　　　　　(baptize, bless)
　　tot-ik　　　　'sich auf den Weg Machen'　(get going)

c. Causative (default form **-is**)

son-ik-is	'schreiben lassen'	(make write)

d. Separative (intransitive) (default form **-uk**)

tomb-uk	'hinaufsteigen'	(ascend)
sot-uk	'springen'	(jump)

e. Separative (transitive) (default form **-ul**)

kok-ud	'gackern'	(cackle)
soong-ud	'anspitzen'	(sharpen)

(35)   Absence of pVHH in Kisamba (Van Acker 2016)

a. Applicative (default form **-il**; **-id** in front of **i**)

ku-kéng-id-il-a	'surveiller'	(to oversee, supervise, watch)

b. Impositive (default form **-ik**)

ku-lémb-ik-a	'apaiser'	(to appease)

c. Causative (default form **-is**)

ku-déf-ís-a	'prêter'	(to lend)
ku-thók-ís-a	'bouillir'	(to cook)

d. Separative (transitive) (default form **-ul**)

ku-sóng-ul-a	'tailler en pointe'	(to sharpen)
ku-tób-ul-a	'percer'	(to pierce)

(36)   Absence of pVHH in Yipunu (Mavoungou and Plumel 2010)

a. Applicative (default form **-il**)

u-dek-il-a	'couler (pour)'	(to flow, run for)
u-ghobul-il-a	'venir quelqu'un en aide'	(to come to rescue someone)

b. Impositive (default form **-igh**)

u-bents-igh-a	'(se) déchirer; fendre; diviser'	(to tear, cleave, divide)
u-ghob-igh-a	'être accroché, suspend'	(to be suspended, pending)

c. Causative (default form **-is**)

u-séék-ís-a	'aiguiser'	(to sharpen)
u-rogh-is-i	'faire grossir; faire grandir'	(to make fat, big)

    d. Neuter (default form **-igh**)

u-mon-igh-a   'être visible; se   (to be visible, show oneself)
                        montrer'

    e. Separative (intransitive) (default form **-ugh**)

u-teb-ugh-a   'se lever (en parlant   (to rise)
                        du jour)'

u-kond-ugh-a   'rendre courbe, tordre' (to bend, twist)

    f. Separative (transitive) (default form **-ul**)

u-lemb-ul-a   'tousser'   (to cough)

u-ghomb-ul-a   'balayer; nettoyer'   (to sweep, clean)

(37) Absence of pVHH in Kiyombe (De Grauwe 2009)

    a. Applicative (default form **-il**)

téémb-íl-a   'marcher sans but'   (walk without goal)

yoob-íl-a   'se laver, se baigner' (wash oneself, bathe,
                        take a bath)

    b. Impositive (default form **-ik**)

léém-ík-a   'abattre, vaincre,   (knock down,
                      humilier'   defeat, humiliate)

yoob-ík-a   'accrocher'   (hang, hook up)

    c. Causative (default form **-is**)

beed-ik-ís-a   'faire apprêter,   (make ready,
                      approcher qch.'   approach something)

soomb-ik-ís-a   'échanger'   (exchange)

    d. Separative (intransitive) (default form **-uk**)

sóók-úk-a   'se détacher'   (break off)

tóót-úk-a   'arriver; paraître'   (arrive, appear)

    e. Separative (transitive) (default form **-ul**)

dyéés-úl-a   'déshonorer'   (dishonour)

téél-úl-a   'enlever du feu une (take a pot from the fire)
                      casserole'

(38) Absence of front pVHH in Kisundi-Kimongo (N'landu Kitambika 1994)

kù-yòb-ìl-á   'se laver'   (to wash oneself)

kù-yònz-ìk-á   'rassembler'   (to gather)

kù-fwéng-ís-à 'cuire mal (aliments)'   (to cook badly)

kù-fyétík-ís-à 'serrer contre quelque chose' (to squeeze against
                                        something)

kù-hèm-ún-à   'souffler doucement'   (to blow softly)

(39) Absence of pVHH in Kihangala (Nkouanda 1997)

a. Applicative (default form **-il**)

tòŋg-ìm-ìn-á	'épier'	(spy on)
dòn-ìk-ìl-á	'écrire pour'	(write for)

b. Impositive (default form **-ik**)

kwès-ìk-á	'consolider'	(consolidate)
kònd-ìk-á	'faire incliner'	(make incline)

c. Causative (default form **-is**)

sèm-ìs-á	'nettoyer'	(clean)
kòsìk-ìs-á	'écraser	(crush)

d. Separative (intransitive) (default form **-uk**)

nòn-ùk-á	'grandir'	(grow)
kèk-ùm-ùk-á	'racler la gorge'	(clear the throat)

e. Separative (transitive) (default form **-ul**)

fyò:w-ùl-á	'se confesser'	(go to confession)

(40) Absence of extension lowering + final root vowel copying in Kikunyi (KongoKing fieldwork 2016 by Guy Kouarata)

a. Causative (default form **-is**)

ku-kweed-is-é	'se faire marier'	(to get married)

b. Separative (intransitive) (default form **-uk**)

ku-beel-uk-e	'guérir'	(to recover)
ku-tób-uk-o	'se percer'	(to pierce oneself)
ku-lemf-uk-ê	's'humilier, obéir, être humble'	(to humiliate, to obey, to be humble)

c. Separative (transitive) (default form **-ul**)

ku-tob-ul-ó	'percer'	(to pierce)
ku-kóóh-ul-o	'tousser'	(to cough)

(41) Absence of pVHH in Kimanyanga (Laman 1912)

a. Applicative (default form **-il**)

vev-il-a	'blow gently, fan slowly'
long-il-a	'practice'

b. Impositive (default form **-ik**)

bemb-ik-a	'fold, bend'
son-ik-a	'write'

c. Causative (default form **-is**)

ved-is-a	'cleanse'
vod-is-a	'cause to commit'

d. Separative (intransitive) (default form **-ul**)

teng-uk-a 'be scattered about'

tol-uk-a 'be broken'

e. Separative (transitive) (default form **-uk**)

seb-ul-a 'change, translate'

bond-ul-a 'knock over, down'

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