

Gichuka Constituent Structure In Government Phonology Theory

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Abstract: Government Phonology is a theory that is based on constraints. There are various versions of the theory and also newer developments. The version used in this paper is the one proposed by Kaye, Lowenstamm and Vergnaud, (1985); (1990); Kaye, (1990) and expounded on by Kula (2002). Government Phonology Theory replaces the rule component with a group of universal principles common to all linguistic systems in the world along with a series of parameters delimiting the nature of linguistic variation from one language system to another. It is a highly constrained theory in its view of phonological structure. Gichuka Structure in Government Phonology Theory is presented as non-branching. The consonantal system of Gichuka is derived from the interaction of seven elements [? L R h I U H A). Gichuka licensing constraints for vowels are: I must be head , U must be head and Phonological expressions must be headed.

Key Words: Government Phonology Theory, Principles, Parameters, Constituent Structure

Date of Submission: 20-02-2018

Date of acceptance: 03-03-2018

I. Introduction

In Government Phonology Theory (GP) there are three recognized constituents: onset(O), nucleus (N) and rhyme (R). The three constituents attach on tier called P⁰ which dominates a tier of timing slots called a skeleton. The smallest interpretable units that combine to form sound segments or phonological expressions (PEs) in GP are elements. Up to nine elements (A I U R H L N h ?) can be employed for the purpose of representing the sound segments of a language depending on the version of GP being used (Kula, 2002). This is why the theory is highly constraining. Certain characteristics are attributed to the elements. Elements are monovalent and they combine to form sound segments traditionally known as phonemes. PEs can be made up of only one element in which case they are simplex, for example, / a / is made up of element (A) or they can be made up of more than one element, in which case they are complex, for example, / p / (? H U) which is made up of three elements. According to the Minimalist Hypothesis in GP, phonological processes apply whenever their conditions are met (Kaye, 1992b). The primary mechanism of phonological change in GP is that spreading of elements. The elements can spread from one segment to another. The notion of spreading means sharing of features and not the total loss of an element in a feature. In a complex PE, one element is head. The other elements that assume a non-head position are called operators/ dependents. Heads rarely spread. Dependents are the ones that spread most. When heads spread, they do so with their dependents. In analysing Gichuka loanwords, I utilized three parameters, Gichuka Licensing Constraints (LCs) and spreading analysis. The parameters are: The parameter on branching structure (branching and non-branching), the parameter on domain-final empty nuclei (the final vowel must be realised ; the final vowel is not realised) and the parameter on domain- initial empty onsets (words must start with an onset; words need not start with an onset). The Principles utilized in the Gichuka structure are the Coda Licensing Principle, the Projection Principle and the Empty Category Principle.

II. Research Methodology

Being a native speaker, the author utilized native speaker intuition to come up with Gichuka lexical items and she also used her knowledge of Government Phonology to come with Gichuka structure in Government Phonology Theory.

III. Gichuka Language

Gichuka is a language spoken by Chuka people. The Chuka are one of the nine Meru sub-groups. The others are Igembe, Tigania, Imenti, Miutini, Igoji, Mwimbi, Muthambi and Tharaka (Bernadi, 1959). By the inception of colonial rule (1913) the Chuka had established themselves as a people different from those around them in terms of their cultural peculiarity, language and territorial boundaries. Their unity was focused on the

Mugwe (spiritual leader) authority. The Chuka live on the South Eastern slopes of Mt. Kenya and cover an area between the Thuci River in the South and Nithi River in the North (Bernardi, 1959). In his renowned classification on Bantu languages, Guthrie (1967) does not classify Gichuka in any of the groups. Heine and Mohlig (1980) separated Gichuka from other sub- Kimeru dialects and put it together with Kikuyu and Kikamba. Paul (2009) lists Gichuka as language No. 12 among Kenya’s indigenous languages. It is classified as Central Bantu in Class E 20 together with Kikuyu, Kamba, Kiambu, Kimiiru, Kitharaka and Mwimbi-Muthambi. The status of Gichuka is described as vigorous (meaning it is in use among all generations) and unstandardized.

IV. Gichuka Phoneme Inventory

Gichuka has seven (7) short vowels which have longer counterparts. It also has seventeen (17) consonants (Kanana, 2011). The vowels and consonants illustrated below are from Kanana (2011) but some of the examples given are my own because not all the Gichuka phonemes are illustrated in the document.

Table 1 Gichuka Vowels

Tongue Height	Front			Back
High	ii:			uu
		ee:		oo:
Mid		εε:	ɔɔ:	
		aa:		
Low				

Source: ‘Dialect Convergence and Divergence: A Case of Chuka and Imenti by F. E. Kanana, 2011, p.191.

Short Vowels

1. /i/ - /keriko / ‘cooking stove’
2. /e/ - /andeka / write’
3. /ε / - / tεnε / in the past ‘
4. / a / - / ona / ‘see’
5. /o/ - / roga / ‘jump’
6. /ɔ / - / ɔβa / ‘tie’
7. /u/ - / ruga / ‘cook’

Long Vowels

1. /i/ as in / βi:mba./ ‘ dead bodies’
2. /e:/ as in / e:ria / ‘that one’
3. /ε : / as in / lε: ta / ‘bring’
4. / a: / as in / b a:ria / ‘there
5. /ɔ:/ as in / ntɔ:γɔ / ‘smoke’
6. /o:/ as in /nto:ra / ‘village’
7. /u:/ us in /mu:ro / ‘heat wave’

Table 2 Gichuka Consonants

	Bilabial	Dental	Alveolar	Palatal	Velar
Plosives	b		t (d)	c (ʃ)	k (g)
Trill			r		
Fricative	β	ð			ɣ
Semi Vowel	(w)		(j)		
Nasal	m		n	ɲ	ŋ

Source: ‘Dialect Convergence and Divergence: A Case of Chuka and Imenti by F. E. Kanana, 2011, p.194.

Plosives

1. /b/ - voiceless bilabial stop –/ ba / ‘give ’
2. /t/ - voiceless alveolar stop –/ βata / ‘sweep’
3. /d/ - voiced alveolar stop- / mogonda / ‘ farm/garden’
4. /c/ - voiceless palatal stop – /oca / ‘pick’
5. /ʃ / - voiced palatal stop - /nʃoke / ‘ bee’
6. /k/ - voiceless velar stop –/ kaβio / knife
7. /g/ - voiced velar stop –/ γaka / ‘ this one’

Fricatives

- 8. /β/ - voiced bilabial fricative - /βaβa/ ‘father’
- 9. /ð/ - voiced dental fricative - /ðoma/ ‘read’
- 10. /ɣ/ - voiceless velar fricative - /ntɔɣɔ/ ‘smoke’

Nasals

- 11. /m/ - bilabial nasal - /mami/ ‘mother’
- 12. /n/ - alveolar nasal - /ona/ see
- 13. /ɲ/ - palatal nasal - /ɲua/ ‘drink’
- 14. /ŋ/ - velar nasal - /ŋombe/ ‘cow’

Semi Vowels

- 15. /w/ - bilabial semi-vowel - /waku/ ‘yours’
- 16. /j/ - palatal semi-vowel - /mbɔja/ dry maize stalk

Trill

- 17. /r/ - alveolar trill - /rima/ ‘dig’

The voiceless palatal stop /c/ is often phonetically realised as [ʃ, s, ç, tʃ.] intervocally or word initially, for example, the word /nɟera/ ‘path’ singular and diminutive can be/ ɟaɟera, ɟaɟera, ɟasera /. The voiced palatal stop /ɟ/ has one free variant [dʒ]. The liquid /r/ has an alveolar lateral [l] as a variant. The alveolar lateral [l] is environmentally conditioned and occurs before /e, ε, .a, o, ɔ / and never occurs before /i, u / (Kanana, 2011). These will be treated in this thesis as derived consonant phonemes in Gichuka. Kanana (2011) does not include pre-nasalised stops in Gichuka. Prenasalized stops will be treated as nasal consonant structures (NCs) in the analysis of phonological processes. The presentation of Gichuka inventory is relevant in the application of GP Theory

The nasal clusters in Gichuka are the following:

Nasal Consonant	Point of Homorganic Nasal Assimilation	Phonetic Symbol	Example	Gloss
mb	Bilabial	/m̄b/	mbori	Goat
nd	Alveolar	/n̄d/	ndeke	aeroplane
ɲj	Alveolar	/ɲ̄j/	ɲjoka	Snake
nt	Alveolar	/n̄t/	ntaka	Mud
nc	Palatal	/n̄c/	ncera	Jail
nth	Dental	/n̄ð/	nthaka	circumcised young man
nk	Velar	/n̄k/	nkūnia	gunny bag
ng	Velar	/n̄g/	nguo	Clothes
nw	Bilabial	/n̄w/	nwabo	Still there

V. Gichuka Constituent Structure in GP

In GP, Gichuka would be characterized as a language without branching constituent structure. Without the use of branching structures, the constituent ‘rhyme’ is no longer a valid constituent in the GP representation of Gichuka structure. This is in line with Kula’s representation of Bemba (a Bantu language spoken in Northern Province of Zambia) (Kula, 2002). However, the representation of long vowels and clusters are explained in the next paragraph so that they too are represented as non-branching. The clusters that are found in Gichuka are consonantal glides (CG) and Nasal-Consonant (NC) combinations which would ideally be represented as contour segments and coda-onset sequences respectively in standard GP. Contour lines are used in GP to represent diphthongs and CG clusters. The use of branching structures to represent NC’s will be avoided by adopting the strict CV version of GP where the syllable is represented as non-branching ON pairs. Following the strict CV approach as adopted in Kula (2002), long vowels, NCs and CGs will also be represented without branching structure. Representations of the Gichuka syllable structures in GP are presented in Figure 9-15. In the absence of the rhymal constituent and the adoption of non-branching structure for Gichuka, constituent government and inter-constituent government are no longer applicable in Gichuka structures. Inter-constituent government will be indicated in long vowels and inter-onset government is indicated in NC clusters. There will be no indication of government in structures that do not have these two segments in Gichuka because the licensing relations between the nuclei and onset hold the phonological word together.

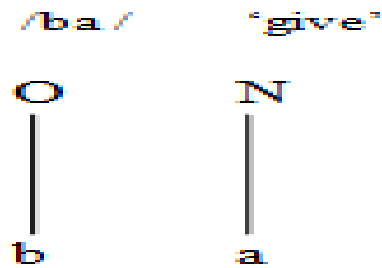


Figure 1: One ON Pair

Figure 1 shows a word with one ON pair. In an ON pair, the nuclei licences the onset. This is nuclei-onset licensing.

/mami/ 'mother'

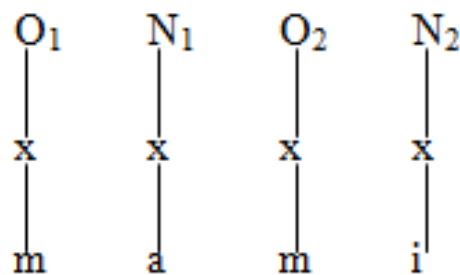


Figure 2: 2 ON Pairs

Figure 2 shows the representation of a word with two ON pairs. The two nuclei license the two onsets.

/morata/ 'friend'

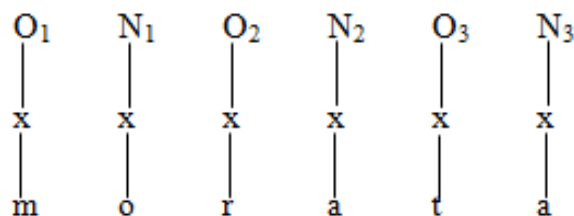


Figure3:3 ON Pairs

Figure 3 shows the representation of a word with three ON pairs. The three nuclei license the three onsets.

Mwana /mwana/ 'child'

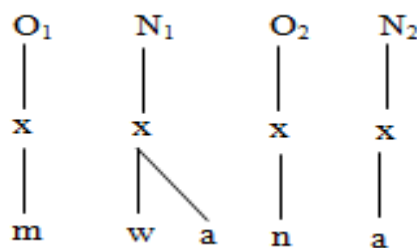


Figure 4: CG Cluster

Figure 4 shows the representation of a CG cluster. The CG structure is represented as a contour segment like a heavy diphthong. The representation for CG clusters allows any consonant to occur with a following glide because the consonant and the glide are in independent constituents. The contour structure imposes no governing relation between its branches while at the same time making the consonant and the glide independent constituents placing no restriction on what consonant may occur in an onset preceding the glide in the nucleus position. Licensing relations hold between the nuclei and the onsets. The two nuclei license the two onsets.

To avoid representing long vowels as a branching nuclei, Kula (2002) proposes that a long vowel be represented as in Figure 5.

(5) Baaria /βa: rea/ ‘there’

Inter- constituent government

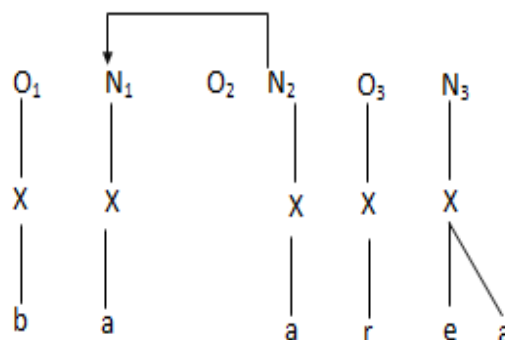


Figure 5: Representation of a Long Vowel

Figure 5 shows the representation of a long vowel proposed by Kula (2002) who suggests that the long vowel should be represented as a sequence of nuclei separated by a non-contentful onset (no timing slot). The onset O_2 is licenced to remain unrealised through proper government under the Empty Category Principle in GP.. The two nuclei in the long vowel representation enter into an inter-constituent government relation that proceeds from right to left. The long vowel contained in N_1 and N_2 acts as the licensor of O_1 . The nucleus N_2 does not license the onset O_2 as required in every ON pair. O_2 being unrealized cannot have a skeletal position. That N_2 does not license O_2 also follow from the fact that it is the licensor of O_1 -it is part of the long vowel contained in N_1 and N_2 that acts as the licensor of O_1 . O_2 does not have a skeletal position meaning that it can never be realised. It also means that the long vowel cannot be broken up by a glide or an epenthetic consonant. (Kula, 2002). However, I would like to propose a different representation for long vowels and diphthongs in Gichuka. This is because the process of consonant epenthesis in Gichuka in loanword adaptation involves the epenthesis of the lateral / r /. The lateral is epenthised between long vowels, for example ‘maka’ becomes ‘makara’ and it is also epenthised between diphthongs (Kitweo becomes getowero). Because of this, I propose that the empty onset in / ba: rea / should have a timing slot in the representation of Gichuka long vowels to allow for consonant epenthesis. The long vowel will therefore be represented as shown in Figure 6.

Inter-constituent government

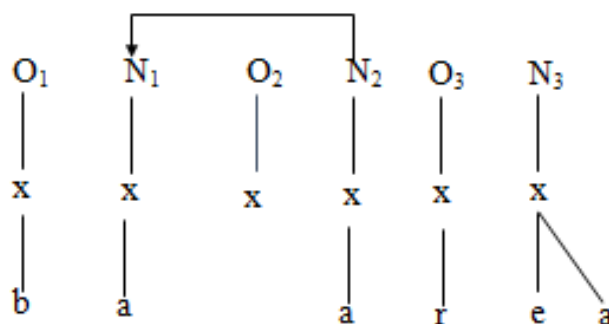


Figure 6: Suggested Representation of a Long Vowel

The long vowel in (6) is represented on two timing slots which contract a government relation where N_2 licenses N_1 . N_3 shows a contour segment which is the standard way of representing a diphthong in GP but it

will not be used in representing Gichuka diphthongs. The proposed representation for diphthongs in Gichuka is presented in Figure 7. Diphthongs too will be represented with an empty nucleus that has a timing slot as shown in Figure 7.

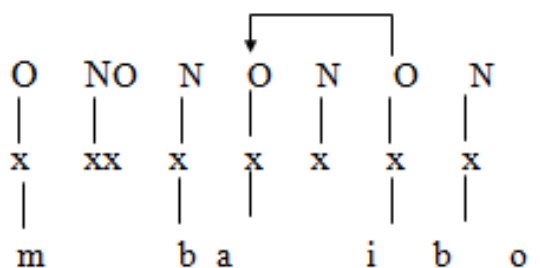


Figure 7: Suggested Representation for Diphthongs in Gichuka

In Figure 7, the diphthong / ai / is represented in the same way as a long vowel and an inter-constituent government relation is contracted between the diphthong. Kula (2002) proposes the representation of NC clusters as sequences rather than units. She gives four reasons to justify this. The first argument is that NC clusters in Bantu languages are restricted to morpheme initial position in their distribution. They therefore fail to pattern with other single consonants which can occur in C₁, C₂, and C₃ positions. NC's have more marked structure than simple unitary segments. Secondly, the dissimilation process called Dahl's law voices the first consonant when two successive syllables begin in voiceless consonants. Voiceless NC clusters are also subject to the process. In Gussi, for example, the rule regularly affected / nk / to give *ɲg* /. Thirdly, some Bantu languages have syllabic nasals in NC clusters. If the NC was a unit rather than a sequence, it would be impossible to represent the syllabicity of the nasal. Finally, in Bantu languages, recessive liquids assimilate to nasals following a nasal. The blocking effect of NC clusters in such cases is possible if the NC clusters are treated as sequences. Therefore the treatment of NC's consist of two parts that occur in a sequence. This treatment of NC's as sequences will prove useful in the analysis of homorganic nasal assimilation and also in cases where there is vowel epenthesis in adapting unacceptable NC clusters that are found in Kiswahili loanwords.

NC cluster: /mbori/ 'goat'

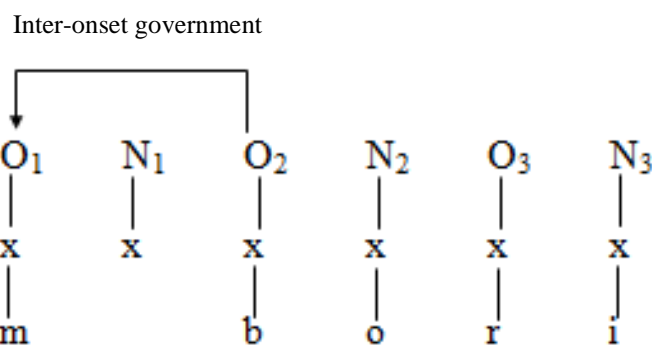


Figure 8: Representation of an NC Cluster

NCs (Figure 8) are represented as sequences separated by an empty nucleus position. The government relation that is contracted between the two onsets is deemed to licence the intervening nucleus to be empty, and must itself be licenced by a following realised vowel. Licencing of the nucleus sandwiched in an inter-onset domain is captured in the final tenet of p-licencing in the phonological ECP. The two onsets enter into inter-onset government that proceeds from right to left. This means that the nasal is the governed member and the governor imposes a requirement that the governee be homorganic to the governor. This rules out non-homorganic clusters because the nasal loses its ability to specify its own place of articulation (Kula, 2002). Initial empty onsets in phonological domains are represented as following from the empty category principle. Languages can be parameterised on whether the initial onset is always realised or not. Figure 9 shows the representation of words with empty onsets.

/ɔna/ ‘see’

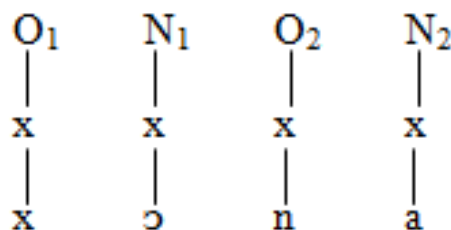


Figure 9: Representation of an Initial Empty Onset

The empty onset structure as represented in Figure 9 where it is captured as a domain initial empty onset parameter and the final nuclei is also captured parametrically as a domain final realised nuclei. The remaining onset and nuclei contract an inter-constituent government relation that proceeds from right to left.

VI. Gichuka Vowel Harmony

According to Hyman (1999), vowel height harmonising is found in many Bantu languages. It is also found in Gichuka. Vowel height harmony in Gichuka is similar to the one found in Kiswahili. It is a lowering process of high vowels that are preceded by mid -vowels in the root. In the applicative suffix, the vowel ~e~ is lowered to / ε /only before the mid-vowels {ε, ɔ} while in the separative suffix, the vowel ~ o ~ is lowered to / ɔ / only following an / ɔ / this is illustrated in the data provided in 1 and 2.

(1)	Verb	Gloss	Applicative Suffix	Gloss
a)	Rīma / rema /	‘weed’	rīm-īra-/remera /	‘weed for’
b)	Ringa / ringa /	‘beat’	ring-īr-a / ringera /	‘beat for’
c)	ruga / ruga /	‘cook’	rug-īr-a / rugera /	‘cook for’
d)	rūg a /roga /	‘jump’	rūg-īr-a / rogera /	‘jump for’
e)	Taara / ta:ra	‘select’	taar-īr-a/ taarera /	‘select for’
f)	Reeta /rɛ:ta /	‘bring’	rete-er-a / retera /	‘bring for’
g)	Oba / ɔβa /	‘tie’	ɔβ-er-a / ɔβera /	‘tie for’

(2)	Verb	Gloss	Separative Suffix	Gloss
a)	Īkara / ekara /	‘sit’	īkar-ūk-a / ekaroka /	‘stand’
b)	Binga / βinga /	‘close’	Bing-ūr-a / βingora /	‘open’
c)	Curia / curia /	‘hang’	churū-ki-a / curokia /	‘unhang’
d)	Kūnja / konja /	‘fold’	kūnj-ūr-a / konjora /	‘unfold’
e)	Maka / maka /	‘be sad’	Mak-ūk-a / makoka /	‘stop being sad’
f)	Tega /tɛga /	‘put on fire’	Teg-ūr-a / tɛgora /	‘remove from fire’
g)	Oba/ ɔβa /	‘tie’	Ob-or-a / ɔβora /	‘untie’

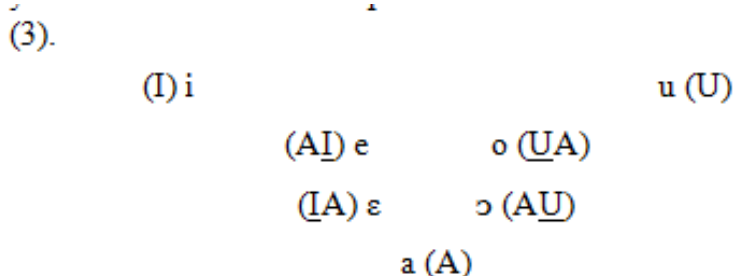
In Gichuka , applicative suffix –e- (a- e) is lowered to /ε / before the mid- vowel { e , o, } (1f and 1 (g)) while the separative suffix vowel -u- is lowered to / o / only following an / o / (2g). Separative and applicative suffixes with / a / show no vowel harmony (1c and 2c). The vowel harmony is characterized as asymmetric because in the case of the separative suffix containing / u /, the mid- vowel / ε / fails to trigger the process (2f) but it triggers the process in 1 (f), (Kula 2002). We would expect the two processes involving the two suffixes to be the same but this is not the case because in the separative suffix, the vowel / ε / (2f) does not harmonise but it harmonises in the applicative (1f). This is why it is described as asymmetric. Gichuka vowel harmony process can therefore be explained by saying that the data in (1a-e) show no harmonisation of the applicative suffix, while (1f) and (1g) do. The data in (2) shows that only the mid vowel /ɔ / triggers harmony. Suffixes with /a / show no vowel harmony (1e and 2e). The vowel harmony is asymmetric because in the case of suffixes containing / u /, the mid vowel /ε / fails to trigger the process (2f). Front- back harmony, vowel roundness harmony and tongue-root harmony are not found in Gichuka.

VII. Licencing Constraints for Gichuka Vowels and Gichuka Vocalic System

The vowel harmony process in Gichuka involves the spread of element (A) into (I) and (U) to result in the complex mid vowels. For the alternation between / e~ ε / and / o~ ɔ / illustrated by the applicative in (1) (refer to the vowel harmony in section 4 above) and the separative in (2) respectively, (A) spreads into (I) for the applicative and into (U) for the separative. Since simplex (A) does not trigger vowel harmony as can be seen in 1(e) and 2(e), which means that (A) spreads into (I) and (U) to form the complex mid vowels [ε, e, ɔ, o]. The spreading (A) is a non-head because the simplex (A) is always headed. This means that (A) spreads as operator

(Kula, 2002). In the harmony process involving the suffix -ɔ- in (2), may be expressed as element (A) spreading into (U). The mid-vowel / ε / does not trigger the process because it contains the operator element (A) that is it is made up of (I, A) and the element (A) can spread into (U). This blocks it from harmonising. There is therefore a restriction on the harmony process. For harmony to proceed unhindered, the trigger of the harmony as well as the target must contain a (U) element. In GP terms, (A) spreads into (U) via an U-bridge. The term U-bridge is a GP term that is used to capture the fact that both the target (either I or U) and the source of spreading (the root vowel) must contain the element (U). If both the trigger and the target must contain the element (I) then it is referred to as an I-bridge and if it must contain (A), then it is referred to as an A bridge (Kula, 2002).

From the seven vowel system of Gichuka, we can characterise the seven vowels as; a (A), i (I), u (U), e(AI), ε(IA), ɔ(AU), o(UA), and then put into consideration the vowel height harmony .. Gichuka vowels are represented as shown in 3.



The vowel harmony facts can be captured under the following process constraints:

- i) A Spreads as operator
- ii) A Spreads into U via an U-bridge

Gichuka licensing constraints for vowels are:

- i) I must be head
- ii) U must be head
- iii) Phonological expressions must be headed.

The LCs are derived from the vowel harmony processes present in the language and they have not been established before.

VIII. Element Geometry in Gichuka

In Gichuka, the place of articulation will be represented by the elements (I) for palatals, (R) for coronals and (U) for labials in the primary location sub-gesture. (A) will not play a role for consonants because there are no laryngeals and pharyngeals in the three languages. Veracity will be represented by a lack of place element following the geometry. The stop versus non-stop will be captured by (?) in stops and (h) in fricatives in the stricture sub-gesture. Voice will be represented by an (L) element in the operator position in non-nasals. Voicing will be treated as the unmarked case with no voice specification while voiceless segments will contain (H). When the element (L) assumes head position, it represents nasality in nasal segments and since voicing is by default a characteristic in nasal segments, nasality will imply voiceness. Nasality and voice is captured by an (L) element. (L) Occupies the phonation sub-gesture in the geometry, which when it is dependent on stricture, contributes voicing When it is head, with some dependent in the location sub-gesture, it contributes nasality. Prenasalized stops will be treated as stops. Glides will have the same representation as the vowels / I / and / U/ and will only be differentiated by their position in the constituent structure. The consonantal system of Gichukais derived from the interaction of seven elements [? L R h I U H A). This element geometry will be used to come up with licensing constraints (LCs) in Gichuka.

IX. Gichuka Licensing Constraints and Consonant Inventory in GP

Licensing constraints are language specific combinations that determine the nativisation of loanwords. The derived consonants are in square brackets. Derived consonants are the variants and allophones in a language which occur in specified phonological environments. Only lexical consonants are used in the derivation of LCs. The NC's are included. The leftmost element in each expression is head. Simplex expressions are headed. Co-operators are elements that can occur together in a PE. Operators are elements that are not heads in a PE.

In all the PEs, the leftmost element is head.

Stops b (? H U) t (? H R) d (? R) c (? H I)
 ʃ (? I) k (? H) g (?.)

Fricatives	β (h. U.)	ð (h. I.)	ɣ (h. H)	[ʃ (h. H. I)]	s [(h H R.)]	[ç (h. I)]	
Affricates	[tʃ (?H. I.)]	[dʒ (h. I.)]					
Nasals	m (L .U)	n (L R)	ɲ (L I)	ŋ (L.)	nd (? L. R)	mb (? L.U)	ng (? L)
	ɲj (? L I).						
Voiceless Nasals	n̄ð (h L H I)	nc (? L H I).		nt (?L H R)		nk	(?. L.H)
	nw(L'R.U).						
Liquid	r (R)		l [R]				
Glides	w (U)		j (I)				

LCs for Gichuka consonants are:

1. ? must be head
2. h must be head
3. L is head in the absence of ? and h
4. ? can licence H U R I L
5. h can licence H I U L
6. L (as head) can licence U R I H
7. H and U can be co-operators
8. H and R can be co-operators
9. L H and I can be co-operators
10. L H and R can be co-operators
11. L and U can be co-operators
12. I and R cannot be co-operators
13. No head may licence more than three operators

Constraints (i), (ii) and (iii) define the major categories of segments namely stops, fricatives and nasals. The constraints in (iv-vi) define the dependents that the major categories (heads) can licence. The constraints in (vii-x) capture the fact that each segment has one place of articulation and lack of a place is interpreted as Verality. Constraint (xii) restricts the size of any expression. It is difficult to tell whether the LCs are similar to any other language and there is need for further research in this area.

X. Conclusion

The long vowel is represented on two timing slots. The CG structure is represented as a contour segment like a heavy diphthong. The empty onset structure is captured as a domain initial empty onset parameter and the final nuclei is also captured parametrically as a domain final realised nuclei. NCs are represented as sequences separated by an empty nucleus position. The government relation that is contracted between the two onsets is deemed to licence the intervening nucleus to be empty, and must itself be licenced by a following realised vowel. The consonantal system of Gichuka is derived from the interaction of seven elements [ʔ L R h I U H A]. Gichuka licensing constraints for vowels are: I must be head ,U must be head and phonological expressions must be headed.

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Dr.Nancy Mbaka " Gichuka Constituent Structure In Government Phonology Theory." IOSR Journal Of Humanities And Social Science (IOSR-JHSS). vol. 23 no. 3, 2018, pp. 51-59.