

The syntax of Agreement in Tiv Counting System

Ishima, Jighjigh Leo Justus

Benue State University, Makurdi

jljishima@gmail.com

Abstract

This work is on the numeral system of Tiv; with the objective of examining the syntactic operations that characterize its derivations. Numerals in Tiv are divided into two classes: The cardinal and derived numerals. The work looks at the morphology of Tiv counting system from this perspective. In their derivation, Tiv utilises the compounding and duplication strategy. The work also discusses the vigesimal system of Tiv numerals. From the syntactic point the work relies on the account of Hurford's (1975) packing strategy. This is a universal phrase structure analysis used in this work with the aim of examining the internal structure of the numerals and show how morpheme features syntactically react by operating as heads or phrasal categories in the derivation. The work indicate Tiv as a language that semantically utilises both the additive and multiplicative strategy and has borrowed from languages like Hausa and English for economy of derivation. The analysis reveals that in Tiv, the higher bases are ordered to the left, contrary to Hurford's claim of their right ordering and its universality.

Keywords: *Tiv, syntax, numeral system, packing strategy.*

Introduction

Tiv is an ethno-linguistic group in Africa whose linguistic history is traced to the Bantu stock. As such, the language is genetically classified as main Bantu group of Benue-Congo branch of the Niger-Congo group of Bantu languages (Abraham, 1940; Crozier and Blench, 1976). The language is typologically classified as Tivoid (Blench, 2011). They number over four million speakers in Benue state (Tser, 2013). Tiv is spoken in Benue state as well as in Nassarawa, Plateau, and Taraba state

The concept of number is universal and every known natural language has a way of naming a few numbers; which may be indigenous to such language, or borrowed. Number is employed to fulfil so many values, like: enumeration, quantification, designation or counting. The particular is expressed on the quantification or enumerative value so desired and the morphological sequences which are used to represent number concepts constitute a class with unique distributional properties. For this reason, number is considered as a class of concepts, just like other classes of objects in any given language. Different languages have their arithmetic concepts by which numbers are combined. E.g. addition, multiplication, subtraction and exponential (Hurford, 2006). Tiv language, for instance employs both addition and multiplication. To achieve semantic value, there is an interaction between morphological constituents and features specification to derive the number expression. This is called the numeral system; so named because it stands unique from other parallel systems in the language. The motivation for this work is to establish a correlation between the universal concepts of number systems and the class of number expressions found in Tiv. The justification for the Syntax of numeral system in Tiv is to investigate the strategies in which linguistic counting systems engage in the numeral system of Tiv.

Tiv has a complex numeral system. There is the indigenous numbering system; then the need for expansion and through language contact with Hausa, Tiv borrowed from its numeral system and also from English. We will examine both the indigenous and the borrowed in this framework. The Tiv numeral system consists of: Cardinal, Ordinal and Nominal

- 1a. M nenge a i-or-ov u-har
1SG.see Adv. PL.people two. 'I saw two people'
- 1b. Ka i-or-ov u-har m nenege a ve ye
FOC.PL .people two 1SG see Adv. 3PL. EMP.

In (1a) cardinal numerical assignment indicates the quantity; while in (1b) ordinality indicates the position of an object in a structure. Not much can be said at the moment about nominal numbering in Tiv because the distributive effects of ordinals extend to cover even nominal.

A look at the literature of numeral system in Tiv indicates that not much previous work exist on it. First documented account of the Tiv numeral system is contained in Abraham (1940). He treats the cardinal numerals and distinguish their class systems when used in the ordinal. The next account is contained in Chen

(2010) who in his account of the numeral system of the world's languages says that Tiv have vigesimal system. Okeke (2013) adopts Chan's (2010) view which he uses in his comparison of Nkpor and what he terms Gboko numeral system. The fact that Tiv operates more than vigesimal numeral system and coupled with the fact that Okeke (2013) accounts of the numeral system of Tiv are not entirely correct reiterates the fact that relatively little is still known about the Tiv numeral system. The present work readily stands to fill this knowledge gap. The data on Tiv numeral system is vast and far beyond the scope of the present paper. I shall therefore limit myself to the structure of its numeral system. However, before arriving at the structure, an account of the morphological derivation of the numerals in Tiv will be examined. The emphasis will be more on the cardinal numbers which achieve abstraction in the Tiv counting system.

Morphological derivation processes in Tiv numerals

The Tiv numeral system is complex, with interwoven systems. The numeral system of Tiv is divided into two: basic and derived. The derived is again divided into two: borrowed sets from Hausa and borrowed sets from English.

Traditional Basic Sets

Tiv employs the traditional system of counting based on the "ten fingers and toes" as these have numeric base. Furthermore, Tiv has both odd and even cardinals; with the first set making up the numeral 1-10. This is shown in the example below:

2. a. mom	'one'
b. u-har	'Two'
c. u-tar	'Three'
d. u-nyiin	'Four'
e. u-taan	'Five'
f. a-tar atar	'Six'
g. u-taan-kar-uhar	'Seven'
h. a-nieni	'Eight'
i. u-taan-kar-uniyin	'Nine'
j. pue	'Ten'

Note: Tiv is a class system language. The prefixes in (2b-i) indicate the class system of the numerals, while (f) is achieved through copy effect. The odd Tiv numerals are presented below:

3. Odd numbers:

- mom - 'one
- u-tar - 'two'
- u-taan- 'three'
- u-taan kar u-har - 'seven'
- u-taan kar u-nyiin - 'nine'

To generate odd numbers in the traditional system, an arithmetic process of addition is required. Here two numeral selections are required to derive the quantification value. For instance in the derivation of the numerals:

- 4a. u-taan-kar-u-har= Seven /7
- b. u-taan-kar-u-nyiin=Nine /9,

The observed process is:

- (a) u-taan kar u-har
(5 + 2 = 7)
- (b) u-taan kar u-nyiin
(5 + 4 = 9)

Here, *u-taan* represents a unit of entity and forms the baseline for the derivation of other odd units below ten, by selecting either *u-har-2*, or *u-nyiin-4*, to add up to *utaan-5* to derive *u-taan kar u-nyiin-9*). *Pue-10* is the first tens numeral in Tiv and forms the baseline for further derivations.

To derive odd numbers using *pue* i.e. (numeral 10).

- 5a. i. pue kar mom 11 (10+1)
 ten passed one
 ii. pue kar u-tar 13 (10+3)
 ten passed three
 iii. pue kar u-taan 15 (10+4)
 ten passed five
 iv. pue kar u-taan kar u-har 17 (10+5+2)
 ten passed five pass seven
 vi. pue kar u-taan kar u-nyiin 19 (10+5+4)
 ten passed five pass nine

kar is a verb particle meaning ‘more than’, which is used to indicate the numeral that adds value to the base as shown in the example above.

For the even numbers, the basic cardinals: 2,4,6,8 are added to *pue-10* to derive the even numbers.

E.g.

- 5b. i. pue kar u-har ‘add two to ten’= 12
 Ten passed two
 ii. pue kar u-nyiin ‘add two to four’=14
 ten passed four
 iii. pue kar a-ter-a-tar ‘add two to six’= 16
 ten passed six
 iv. pue kar a-ni-a-ni ‘add two to eight’=18
 ten passed eight’

The derivations (5.b.iii and iv) have complex derivational process that involve **an** assimilation process and reduplication through copying process. That is, *u-tar* ‘3’ is copied and in the process drops the prefix *u-* and picks the prefix *a-* to mark plural. This process thus accounts for the derivation of the numeral six in Tiv *a-ter-a-tar* (6) and *ani-ani* (8). In derivation examples (5.a.vi and vii), *pue* (10) take additional units to derive numerals (5.a.vi) and (5.a.vii) respectively; i.e. (10+5+2 = 17; 10+5+4 = 19, respectively).

The numeral twenty is called *i-kundu* (twenty/20), just like *pue* (ten/10) *i-kundu* is a tens numeration counted as a single entity. The derivation of additional numeric quantities from *i-kundu* is achieved through the same process as in *pue* (10) (5a and 5b) for both odd and even numbers respectively. The matrix from *mom* (one/1) to *u-taan- kar- -unyiiin* (1-9/nine) are used, and they are added to ten for the required derivation.

6. *I-kundu-gber* = 30; i.e. *I-kundu + gber*; metaphorically means 20 round 1 tens, i.e. 20 tens + 10 tens = 30.

Interestingly, *i-kundugber* (30) is the first odd number in the tens group. Odd numbers derived from *i-kundugber* (30) fall within the pattern earlier accounted for, the tens combination (i.e. tens of twenty and ten) can yield numerical system of up to 99 in Tiv.

E.g. 7.a. *I-kundu + gber*; here considered a single unit of twenty plus ten; then:/b. *a-kundu a-har* (i.e. 2 units of 20 tens = 40);

where a morphological operation in the derivation is such that *i-kundu* drops the prefix {*i-*} of the singular class, replacing it with {*a-*} of the plural class. Correspondingly, {*u-*} in *u-har* is dropped, replaced with {*a-*} *har* to derive agreement in the plural. The prefix {*i-*} and {*a-*} act as class marker morphemes in Tiv and when employed in the syntax of numeration, {*i-*} now acts as singular marker, while {*a-*} acts as plural marker in the derivation, thus marking concord with the head. This now renders 20 in the plural or tens of twenty. This is exemplified in:

7b. *a-kundu a- tar* (i.e. tens of 20 + 3) = 60

Or (20+20+20) = 60

7c. *a-kundu a- tar gber* (i.e. tens of 20, 3 times round 1 tens) = 70

Or (20+20+20+10) = 70

This process is strictly additive and is capable of derivations up to numeral 99.

Between cardinal or base numbers and derived numbers, the lines are coterminous. This is because in the Tiv numeral system, within the basic numerals 1-10, derived process of compounding start from 7 and 9. In the case of the numeral 6 and 8, there is a derivational process of reduplication through full copying of

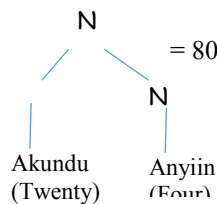
the root numeral characteristic of a morphological process involving feature check in a polymorphic derivation. Remember that we had earlier indicated discuss this process in the exercise that characterizes the change in *u-tar u-tar a-ter-a-tar*, so likewise *u-nyiin u-nyiin ani-ani* (8). We will now consider derivation through compounding.

Derivation through compounding

Compounding in this instance is achieved through a system of merge which means a process of packing of existing numerals together to indicate new quantity. This aspect plays a significant role in the numeral derivation system of Tiv. First, in the cardinal, numerals 7 and 9 are derived through compounding. This enables the counting to cover a large domain. For instance by compounding 20 with other numerals, you can count large quantities. The process is achieved through multiplication as follows:

- 10.i a-kundu a-har = 40 (20* 2 = 40)
- ii. a-kundu a-tar = 60 (20*3=60)
- iii. a-kundu a-nyiin = 80 (20*4=80)
- iv. a-kundu a-taan = 100 (20*5=100)
- v. a-kundu pue= 200 (20*10=200)
- vi. a-kundu kyundu= 400 (20*20=400)

In the examples (10i-iv) there is feature marking between the base numeral on the left. This marking is for plural concord with the head. The numeral acting as multiplication frequency necessarily drops its prefix morpheme, here {*u-*} and adopts the {*a-*} plural morpheme of the root. This is a plural marking strategy in the language which marks concord between the head noun of the compound and the bound element. Diagrammatically, we can have the following:



Derivation through compounding with borrowed numerals

This is a compounding derivation using borrowed numerical expressions. The borrowing is for convenience of expansion. It enables the numerical system of Tiv to be extended almost indefinitely.

Borrowed numerical expressions from Hausa

Tiv counting system borrowed the numerals *deri* (100) and *dubu* (1000) from Hausa. The borrowing is for economy and expansion. Consider the numeral 100 in these languages:

- | | |
|----------------------|-------------|
| Tiv | Hausa |
| a-kundu a-taan = 100 | deri = 100; |

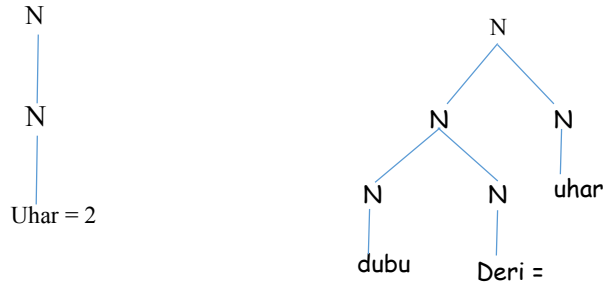
So even though the number 100 has numerical value in Tiv, its derivation is however, through compounding whereas in Hausa the same numeral value is represented as a single unit. So for the sake of economy there is preference for this unitary expression so as to expand the counting strength of Tiv, hence the adoption; as exemplified:

- i. deri mom (i.e. one unit of hundred) = 100
- ii. deri u-har; (two units of hundred) = 200
- iii. deri u-taan- { kar } u-nyiin (nine units of hundred) = 900

(As earlier explained, *Kar* in Tiv counting pattern serves as a verbal particle that indicates a unit is more by a certain numeration.)

After *deri*, (100) the next numerical unit of adoption from Hausa is *dubu* (unit of thousand). To achieve derivation, there is merge operation and adjunction is to the left as exemplified in the derivation of the numerical value 200, 000 below:

- 12 i. iii.



Where *dubu* = 1000, *deri* = 100, *uhar* = 2, i.e. unit of 1000, 100times x 2 = 200,000. We can say that the adopted version from Hausa is derivationally economical, in the minimalist spirit of Chomsky (2015).

Borrowed numerical expressions from English

To further expand its numerical frontier, the numeral system of Tiv has borrowed the unit 1000,000 (one million) from the English numeral system. The descriptive derivational processes above are not an exhaustive account of the Tiv numeral system. They however serve our purpose of paving way for a syntactic analysis of Tiv numeral system.

Syntax of Tiv Numeral System

The morphological components which make up the expressive values for the Tiv numeral system exhibit specific traits with distributive values. This section therefore aims at investigating the structure of these general properties. This would help in understanding further, how the Linguistics of Tiv counting system is packaged. It is possible that number expression in Tiv is infinite. The issue for determination therefore is that of well-formedness. The determination issue in the syntax of numerals is the packing and the strategy involved. As a theory packing traces its origin to Hurford (1975). It has to do with the derivational processes used in the derivation of compound numerals (both the complex and very complex). The strategy which has its roots in the generative enterprise (Chomsky 1957) entails generating all and only well-formed numerical expressions in an economic way without losing the semantics: Hurford (1975) cites the strategy for numerical calculation to involve multiplication, addition etc. To generate complex numbers, a system of recursion is introduced.

13. Number →/ (Number) which combined with the algorithm of tree building yields the phrase marker.

Hurford’s (2006) universal structure rule is stated below:

14.

Number Phrase: (Number) Interpreted by addition

Phrase (Number) m (interpreted by multiplication)

The structures in (13) and (14) above are similar. They indicate arithmetic process of derivation either through addition (+) or multiplication (x). The rules further imposed constraints; which account for placing number in (13) and (14) above in brackets.

Addition Numerals in Tiv

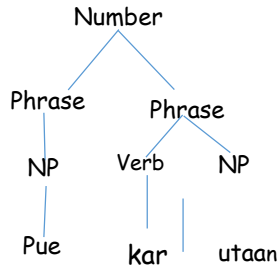
The principle of stalking strategy is used to account for the structure of compound numerals through well-formed generations; employing the numerical strategy of addition of one number to another to derive a bigger number. The Tiv examples include:

16.i. pue kar mom ‘eleven’
tenpassed one

ii. pue kar u-har ‘twelve’
tenpassed two

- iii. puekar u-tar ‘thirteen’
 ten passed three
- iv. pue kar u-nyiin ‘fourteen’
 ten passed four
- v. pue kar u-taan ‘fifteen’
 ten passed five

The process involves derivation through addition. Using the universal phrase structure rule, we can account for examples in (16i-v), through a generalized rule using, (16v) *pue kar u-taan*: 17a.



- b. [s [pue] [vp [kar] [utaan]]]

The structures in (17a & b) consist of a non-complex NP in both subject and object positions, with the object NP embedded within VP. The phrase structure can account for more complex derivations as in the following:

- 18. akundu-ahar-gber kar u-taan kar unyiin = 59
(i.e. 20 tens 2times also 10 tens add once = 50, plus 5, plus 4 = 59).

Multiplication Numerals in Tiv

The multiplication numerals strategy is operable in Tiv. The strategy is utilized to account for the higher complex values. Those numerals borrowed from Hausa language fall into this category as well as those borrowed from English. They cover expressions in hundreds of thousands. Hurford’s (2006) packing strategy is here adopted though the analysis however yielded a slightly different account. Hurford’s account claims that ‘Higher-valued multiplicative bases are packed nearer the top of the phrase structure tree’ with ‘the higher bases ordered to the right of the lower ones’ (p.775

In the case of Tiv, this proposal holds except for the ordering of the base. Hurford’s account is that the higher bases are ordered to the right of the lower ones with the claim that this is operable in English and other languages too. In the case of Tiv the reverse holds. The interesting phenomenon in this representation is that if you do the multiplication leftward or rightward, you would still obtain the same value. E.g.

- 19a. Leftward: 2x100 = 200 x 100 = 200,000
- b. Rightward: 1000 x 100 = 100,000 x 2 = 200,000

However, the leftward account holds for Tiv because *u-har* (2) is the functional head in the configuration. The Tiv numeral system has adopted from English the numeral concept of million; regarding it as a unit of six zeros (000,000) which any figure between 0-9 can be prefixed before the zeros to obtain a number. Examples:

- 20.a. 1,000,000 – million *mom*
- b. 2,000,000 – million *u-har*
- c. 3,000,000 – million *u-tar*
- d. 10,000,000 – million *pue*

The same configuration can serve the derivations from 2-10 millions. What obtains is, one simply attach the base to the left of 'million', the next highest numeral and multiply million by that value to get the next highest value.

The Tiv numeral system also combines the Hausa and English numerals to get higher derivations. To derive 100,000,000 for instance: pick *dubu* (thousand) in Hausa; followed by 'deri' (100) also in Hausa. Then add 'million', in English, so that you have:

21a. Million *dubu deri mom* = 1000,000,000 b. Million *dubu deri uhar* = 2000,000,000
To obtain a higher value, pick the next higher number and multiply it by million to derive the next value as in.

22 Million *dubu deri uhar* = 2000,000,000 (million thousand hundred times two);

by multiplicative value, left or right the same value is obtained. With this strategy, the numeral system of Tiv can obtain values up to trillion.

Conclusion

This work is an attempt to create an insight into the derivational processes in the numeral system of Tiv. Tiv has an indigenous system of numeration; Okeke (2013) cited in Chan (2010) as a vigesimal numeral system. This account is partly correct; but does not wholly apply. The vigesimal system in Tiv numeral system operates using the ten fingers and toes. Thereafter the system of tens, employ base 20 and base 10. The Tiv numeral system, in order to account for higher derivations, employs stalking strategy of multiplications. Addition is used in the less complex derivations. No doubt Hurford's account has applicative values in the Tiv numeral system, however it needs to be re-stated to accommodate Tiv which has higher values on the left- most side, instead of the right- most side as contained in Hurford's account. This work is not an exhaustive account of the numeral system of Tiv. More scholarly attention is required in several other aspects of the Tiv numeral pattern before an exhaustive account of its numeral system can be satisfactorily accounted for.

References

- Abrahams, R.C. (1940). *The Principles of Tiv*. London: Crown Agents, 4 millbank.
- Anderson, S.R. (1992). *A-morphous Morphology*. Cambridge: Cambridge University Press.
- Blench, R. (2011). *The Tivoid languages: classification and Comparative Word list*. Cambridge: Kay Williamson Educational Foundation.
- Chan, E. (2010). Numeral Systems of the World's Languages. Available in http://www.lingweb.eva.mpg.de_numeral_home.html. Accessed on 18/11/2016.
- Chomsky, N. (1957). *Syntactic structures*. The Hague: Moutan.
- Chomsky, N. (1995). *The Minimalist Program*. Cambridge, M.A. MIT Press.
- Chomsky, N. (1982). *The Generative Enterprise*. Dordrecht: Foris.
- Crozier, D. H. and Blench, R. M. (eds.) (1976). *An Index of Nigerian Languages*. (2nd edition). Abuja: NERDC.
- Hornstein, N. (2001). A Short Note on Non-Obligatory Control.
- Hurford, J. (1975). *The Linguistic Theory of Numerals*. Cambridge: Cambridge University Press.
- Hurford, J. (2006). "A Performed Practice Explains a Linguistics Universal": Counting gives the packing Strategy. *Lingual* 177:773-783.
- Lyons, J. (1974). *Introduction to Theoretical Linguistics*. Cambridge: Cambridge University Press.
- Okeke, C. (2013). "The Numeral System of Nkpor and Gboko": in *the Numeral Systems of Nigerian Languages* (ed.). LAN occasional publications no.2.
- Payne, E.T. (1997). *Describing MorphoSyntax*. New York: Cambridge University Press.

Tone in Gbagyi Nge Nominal Pluralisation

Dalhatu Abigail Musa

Nasarawa State University, Keffi.

Email- ab4gee@yahoo.com

Abstract

This paper seeks to carefully examine the pluralisation process in Gbagyi with the intention to identify and bring to limelight the tonal processes that take place within this inflectional phenomenon. This paper bases its investigation on Gbagyi Nge dialect (of Gbagyi language) spoken in the Federal Capital Territory. Based on an obvious fact that singular nominal are pluralized through a prefixation process, the paper intends to determine the inherent tone of the plural prefix in order to account for the tonal processes which are triggered by this pluralisation process within the non-linear theoretical framework using primary data which were elicited from three native speakers of Gbagyi Nge dialect of Bwari Area Council Abuja. This paper therefore suggests that the plural prefix in Gbagyi Nge is inherently toneless and that it acquires a surface tone either through L-spread rule or the high tone spread rule. This research also argues that the rising tone does not exist in Gbagyi Nge.

Keywords: *tone, low-spread, high-spread, pluralisation.*

Background

Linguists have shown that some phonological phenomena may not receive easy explanation within a linear theoretical framework. One of such phenomena is tone. Gbagyi pluralisation affords another opportunity to showcase the elegance of accounting for tonal phenomenon within a non-linear theoretical framework. Although tone in pluralisation is a universal phenomenon in many world languages, it is observed to behave with peculiarity in individual languages such that the tonal behaviour differ one language from another. There is therefore the need for language specific investigation of tone in pluralisation, so as to understand and appreciate the uniqueness of such tonal processes in the individual languages. As a further proof that tonal modifications within pluralisation context abound in languages, we shall review some research findings discovered through the survey of the existing literature. For instance, Cahill (1999), in his study on Konni nominal pluralisation, reports that Konni nouns typically end in velar nasal and is characterised by high tone which docks the final syllable of the stem. However, he observes that the plural suffix acquires its tone through the tonal rule of polarization. This means that since the noun stem mostly bears a high tone, the plural suffix [-a, -I, -o] takes on the low tone but when the final TBU of the stem is low, the plural suffix takes on a high tone. Cahill (1999) provides the following data to illustrate this:

1) Singular	Plural	
túŋ	túò	‘bean’
wíŋ	wíè	‘face mark’
ní:ŋ	niè	‘grinding stone’
dí:ŋ	diè	‘forehead’
múgúŋ	múgà	‘river’
dũŋ	dùnné	‘knee’
tãŋ	tàná	‘stone’

Similarly, Akalig-Pare and Kenstowicz (2002:70) carried out a study on Buli pluralisation. In their investigation of tone in Buli, a Gur language spoken in the upper east region of Ghana, they report that the plural suffix of Buli typically terminates in [-a] with a low tone. The authors observe however that the low tone of the plural suffix raises to mid tone when it occurs after a mid-toned final syllable of the noun stem as in bãŋsà ‘lizards’ versus bãŋsã ‘bangles’ and raises to high tone when it occurs after a high toned final syllable of the stem and before a high toned definite suffix [-ŋá] as in bísà ‘children’, bisánjá (def.). Akalig-Pare and Kenstowicz (2002:70) provide the following data below to further illustrate their claim:

2) Tone rule: L →	M/M +	—	
	L →	H/H +	+H
cí:-sà-ŋá	bãŋ-sà-ŋá	bãŋ- sãŋ-sãŋá	Underlying
inappl.	bãŋ-sà-ŋã	inappl.	L → M/M+ --
cí:-sã-ŋá	inappl.	bãŋ-sà-ŋã	L → H/H+ -- +H
inappl.	inappl.	bãŋ-sà-ŋã	low tone spread
cí:sá-ŋá	bãŋ-sã-ŋá	bãŋ-sà-ŋã	output
‘moons’ def.	‘bangles’ def.	‘lizards’ def.	

Also, Mcpherson (2017:7) carried out a study on the plural formation of Seenku, a North Western Mande language of Burkina Faso. He reports that the nominal plural is characterised by a process of tone raising in which X (extra low) raises to L (low) and H (high) raises to S (super high); since S (super high) is

already the highest tone in the language, singular S (super high) nouns remain S (super high) in the plural. McPherson (2017:7) provides the data below:

- 3) bĕ → bĕe ‘pigs’
 jÿ → jÿi ‘hills’
 mḍ → mḍε ‘persons’

Mcpherson (2017:8) further observes that when the singular nouns are of contour tone of H-X (high and extra low), the plural takes super high (S) tone. He gives the examples below:

- 4) bī → bī ‘goats’
 kâ → kĕ ‘yams’
 gôo → gǒεε ‘trees’

Interestingly, most of these languages reviewed adopt a suffix as the plural marker; Gbagyi Nge uses a prefix for the same purpose exploring the tonal manifestation of this prefix is the objective of this paper and it will be done within the framework of non-linear phonology. The fundamental assumptions of the theoretical model are presented in section (2) below.

Theoretical Framework

This study analyses its data within the theoretical model of autosegmental phonology. The theory believes that the speech stream could be divided into horizontal layers. Features which indicate to be independent units are represented on independent tiers (Goldsmith, 1976). Autosegmental theory defines several conventions that guide the association of tone to tone bearing units (TBUs). They include the following:

Association Conventions (Goldsmith 1990:14): This requires that, for any given morpheme, the individual tones should be mapped unto its tone bearing units; from left to right, in a one-to-one fashion.

Well-formedness condition (WFC) (Goldsmith, 1976:207): This states that each vowel must be associated with at least one toneme, each toneme must be associated with at least one vowel and association lines should not cross.

Obligatory contour Principle (Goldsmith, 1990:309): This states that adjacent identical features are prohibited on the same tier.

In any normal case, a tonal melody may be realised differently on certain morphemes even though morphemes traditionally exhibit single tonal melody on their segment. However, morphemes may sometimes manifest tonal melody without any segment (floating) and at other times, they may have no tonal melody (toneless morpheme). It is therefore necessary to represent tones and other suprasegmental features as separate from segmental tiers, since they have proven to be highly independent as compared to the segments (consonants and vowels).

Language Review

The language Gbagyi is spoken in five states of the federation. They include Niger, Nasarawa, Kaduna, Kogi and Federal Capital Territory. The speakers are estimated according to the population census (2006) to be 4.5 million. Gbagyi is classified as a Nupoid language of the Niger-Congo group (Blench, 2013). However, this study shall be based on Gbagyi Nge dialect of Bwari Area Council-Abuja. Furthermore, the following information are considered necessary for this study. Morphologically, Gbagyi exhibits features of both isolating and agglutinating language type. At the phonological level, particularly at the autosegmental level, Gbagyi has the following syllable structure types: CV, CGV, V and N with the CV structure being the predominant syllable structure type in this language exhibits combinatory possibilities such as CVN and VCV. The VCV word structure constitutes nominal words with the initial V representing noun class marker for both singular or plural. The tonal system on the other hand is described below:

Gbagyi Nge dialect operates both register and contour tone. The register tones include: Supper high [ˊ], high [ˊ], mid [usually left unmarked] and low [ˋ]. The contour tones on the other hand include: super high falling [ˊˋ] and falling [ˋ]. Contrary to Hyman and Magaji’s (1970) speculation, the researcher based on her native intuition argues that the rising tone does not exist in the dialect and the data they present to illustrate their claim clearly indicates final mid rather than rising. Observe the data below:

- 5) òshǎ [òfǎ] ‘neck’*
 bùgbǎ [bwùgbǎ] ‘heart’*
 gyiwyĕ [gjiwjĕ] ‘money’*
 òwyĕ [òwjĕ] ‘lizard’*
 6) òshǎ [òfa] ‘neck’

bùgbà [bwùgba] 'heart'
 gyiwyé [gjiwje] 'money'
 òwyé [òwje] 'lizard'

Tonal Patterns and Distribution of Gbagyi Nge

In this dialect, tones occur in specific patterns just like in the case of the phonemes because they contribute to meaning expression the same way the phonemes do in the dialect. The following include the patterns of tonal distribution in the dialect.

Super High [˥]

Gbagyi Nge like some Bantu languages operates a super high tone level. Although previous researchers like Hyman and Magaji (1970); Dalhatu and Gwamna (2012) speculate it to be the normal high tone, current study presents evidence that proves otherwise as the normal high tone is identified to be distinct from it. This level tone occurs analogously that is, it occurs at word initial, medial and final position in the dialect. To illustrate this, examples are provided below:

7) Word Initial	Word medial	Word final
nyikna [nɪknǎ] 'teeth'	anyikna [ánɪknǎ] 'teeths'	gache[gaʃé] 'kitchen'
kuta [kútá] 'stone'	akuta [ákútá] 'stones'	akuta [ákútá] 'stones'
fuwa [fúwá] 'house'	afuwa [áfúwá] 'houses'	tukwo [túkwó] 'head'
tukwo [túkwó] 'head'	ashnuwna [áʃnúwnǎ] 'trees'	obi [ébjí] 'child'
sukwo [súkwó] 'nigh'	aweba [áwjbá] 'face'	awe [áwǐé] 'eyes'

High [˥]

Gbagyi Nge also operates a normal high tone which is distinct from the super high tone. This tone was speculated by the earlier researchers such as Imam (2011), Dalhatu and Gwamna (2012) following Hyman and Magaji (1970) to be a mid tone but contrary to this present research presents facts which suggest it to be a high tone. The tone is further observed by the researcher to occur in analogous environment That is to say, it occurs at the initial, medial and final position of words. Examples are provided below:

8) Word initial	Word medial	Word final
oje [ódzɛ] 'beer'	özäbi [özäbjí] 'one's child'	ösü [ösü] 'king'
onya [óná] 'a thing'	kwálámí [kwálámí] 'palm oil'	ḃēdā [ḃēdā] 'a word'
afuwa [áfúwá] 'houses'	[núwnáknúnú] 'alligator'	oje [ódzɛ] 'beer'
ogye [ógjé] 'sleep'	[kwánúkpé] 'plate cover'	ona [óná] 'dream'
ofa [ófá] 'farm'	ozába [ózábá] 'one's husband'	apmi [ápmí] 'razor blade'

Mid [unmarked]

The mid tone which is usually left unmarked was earlier claimed by Smith (1967); Hyman and Magaji (1970) to be a lower-mid tone which was speculated to be an allotone of the mid tone. However, based on new findings in the present research, this tone is argued to be actually a register mid tone. The environment of occurrence of this tone is also analogous such that it occurs at word initial, medial and final position of words in this dialect. Below, examples are provided:

9) Word Initial	Word medial	Word final
nufu [nufwú] 'beneseed'	anufu [ànufwú] 'beneseeds'	kna [knā] 'to fry'
kala [kalá] 'strength'	akala [àkalá] 'strengths'	si [sji] 'to buy'
nyagyi [nagjì] 'food'	apulu [àpulú] 'forest'	fniya [fníja] 'sweep away'
shnama [ʃnāmá] 'yam'	ashnama [àʃnāmá] 'yams'	omi [òmjí] 'i, myself'
mula [mula]	amula [àmúla] 'weddings'	òyi [òjí] 'we'

Low [˥]

The low tone is another register tone type in the dialect. It occurs analogously. That is, it may occur at the initial, medial and final position of words in the dialect. Below, examples are provided to illustrate this.

10) Word initial	Word medial	Word final
ovi [òvji] 'a thief'	agnagba [àgnāgbà] 'gossips'	osa [òsà] 'time'
oda [òdá] 'father'	abwada [àbwádà] 'shoes'	nyagba [nāgbà] 'pepper'
okna [òknā] 'monkey'	adawiya [àdāwjijà] 'masquerade'	anya [àpà] 'dispute'
achi [àʃí] 'injection'	adugba [àdùgba] 'frogs'	chokwo [ʃòkwò] 'soap'
akata [àkatá] 'lies'	agyiwe [àgjiwje] 'money'	oya [òjà] 'mother'

Super High-Falling tone [˥˥]

Gliding tones are also attested in the dialect and a careful examination of data indicates that the super high falling tone is realised as the result of the tonal process of spreading. In this case, the disyllabic word is underlyingly super high-low tone but the super high tone of the first syllable spreads across the second syllable thereby adding to the inherent low tone thereby resulting into a super high falling contour tone. This claim is clearly proven by the fact that contour tones do not occur at word initial position in the dialect (they occur word finally) and the fact that they occur after super high tone. Examples are provided in (11) below:

- 11) shnuwna [ʃnũwnã] ‘a tree’ tnutnu [tnũtnũ] ‘work’ snuknu [snũknũ] ‘borne’
 shaknu [ʃãknũ] ‘a pot’ nyikna [ɲĩknã] ‘tooth’ wyegbma [wǰɛgbmã] ‘darkness’

Falling [˥]

As distinct from the super-high tone above, the dialect also operates a normal falling tone which is constituted by high tone gliding to low tone as a result of high tone spreading (HTS) rule. Hyman (2007) identifies this as a horizontal tonal assimilation process. As earlier stated, the falling tone is realised as the result of the high tone spread. In this case, the disyllabic word has an underlying HL tone pattern but the high tone of the first syllable spreads across the second syllable thereby resulting into a falling glide tone. This claim is clearly proven by the fact that they occur only word finally and only after a high tone. Examples are provided in (12) below:

- 12) pita [pítã] ‘leg’ oya [ójã] ‘boat’ myiknu [mjĩknũ] ‘hunger’ snusnu [snũsnũ] ‘pity’
 oznu [óznu] ‘palm carmel’ ami [ámĩ] ‘blood’ obe [óbɛ] ‘knife’

Data Presentation and Analysis

In the plural formation process of the dialect, a tonal process is observed to play an indispensable role such that tone, the suprasegment feature, both at surface level contributes to the realization of this inflectional process of pluralisation. It is noteworthy to mention here that although the nouns of Gbagyi Nge dialect are generally characterised by the word structures of VCV (with noun class marking vowel) and CVCV, consideration is given here only to the CVCV (disyllabic) nouns so as to enable the researcher to clearly demonstrate the way plurality is realised and to identify what tonal processes are triggered by this inflectional process in the dialect. Equally important is the fact that Gbagyi nominal words are characterised by eight (8) tonal patterns. They include: SH-SH, LL, HH, MM, M-SH, LM, H-SH and ML. When the plural prefix [a-] is affixed to the noun stem with any of the above tonal pattern, it either bears a high tone or a low tone, as a result of certain observable tonal processes. In what follows, we shall identify the inherent tone of the plural prefix and analyse the possible tonal modifications that are triggered by the process of plural formation in Gbagyi Nge dialect.

In the following, the researcher attempts to determine which of the two tones is inherent to the plural prefix in order to account accurately and adequately for what tonal processes take place in the course of this inflectional process in Gbagyi Nge dialect.

a. /a-/ → [H]/ [SH]: (The prefix occurring as high before super high tone)

- 13) Plural Singular
 [fwúwã] [áfúwã] ‘houses’
 [ʃãknũ] [áʃãknũ] ‘pots’
 [túkwo] [átúkwo] ‘heads’
 [kwútã] [ákwútã] ‘stones’
 [mánãjĩ] [ámánãjĩ] ‘good ones’
 [kwúwji] [ákwúwji] ‘orphans’
 [ɲĩknã] [áɲĩknã] ‘teeth’
 [tnũtnũ] [átũtnũ] ‘works’

b. /a-/ → [H]/ → [H]: (The prefix occurring as high before a high tone)

- 14) Singular Plural
 [pítã] [ápítã] ‘legs’
 [pwúgjã] [ápúgjã] ‘forms’
 [gǰɛgbmã] [ágǰɛgbmã] ‘snorings’
 [zákwojĩ] [ázákwojĩ] ‘old men’
 [ɲĩkwózã] [áɲĩkwózã] ‘females’
 [wǰida] [áwǰida] ‘corn owners’

c. /a-/ → [H]/ [H] (A prefix occurring as high before a high tone)

15) Singular	Plural
[gníkwo]	[ágníkwo] 'markets'
[níkwó]	[áníkwó] 'wives'
[zókwú]	[ázókwú] 'oaths'
[zákwójí]	[ázákwójí] 'old people'
[níkwójí]	[áníkwójí] 'old women'

d. /a-/ → [L]/ [L] (A prefix occurring as low before a low tone)

16) Singular	Plural
[bwàdà]	[àbwàdà] 'shoes'
[dùgba]	[àdùgba] 'frogs'
[bàknà]	[àbàknà] 'fences'
[bègjè]	[àbègjè] 'necks'
[jàwji]	[àjàwji] 'many maize'
[dàdà]	[àdàdà] 'foreheads'
[nàgbàzni]	[ànàgbàzni] 'pepper plantations'
[gìwje]	[àgìwje] 'a lot of money'

e. /a-/ → [L]/--- [M] (A prefix occurring as low before a mid tone)

17) Singular	Plural
[mùlǎ]	[àmùlǎ] 'weddings'
[nǎgǐ]	[ànǎgǐ] 'foods'
[kǎtǎ]	[àkǎtǎ] 'lies'
[kǎlǎ]	[àkǎlǎ] 'strengths'
[kǎpwú]	[àkǎpwú] 'navels'
[pǎfǐ]	[àpǎfǐ] 'mats'
[fǎnǎmǎ]	[ànǎnǎmǎ] 'tubers of yam'
[kǎpǎdǎ]	[àkǎpǎdǎ] 'cemented floors'
[nǎknú]	[ànǎknú] 'rooms'
[gǎfǐ]	[àgǎfǐ] 'kitchens'

f. /a-/ → [L]/---- [M] (A prefix occurring as low tone before a mid tone)

18) Singular	Plural
[snìknǎ]	[àsnìknǎ] 'irons'
[tnubwǎ]	[àtnubwǎ] 'ears'
[fǎnipǎ]	[àfǎnipǎ] 'doors'
[kǎpǎdǎ]	[àkǎpǎdǎ] 'cemented floors'
[gǎnumǎ]	[àgǎnumǎ] 'catarrhs'
[znudù]	[àznudù] 'crosses'

g. /a-/ → [L]/---- [H] (A prefix occurring as low before high tone)

19) Singular	Plural
[bǎjímǎ]	[àbǎjímǎ] 'child bearings'
[dǎgǎkpǎ]	[àdǎgǎkpǎ] 'blouses'
[nǎkǎ]	[ànǎkǎ] 'writings'
[nǎsǎjǐ]	[ànǎsǎjǐ] 'a lot of buying'
[bǎdǎ]	[àbǎdǎ] 'words'
[bǎémǎ]	[àbǎémǎ] 'blames'
[nǎitalǎ]	[ànǎitalǎ] 'tongues'
[wǎjǎsǎlǎ]	[àwǎjǎsǎlǎ] 'fishes'

h. /a-/ → [L]/--- [M] (A prefix occurring as low before a mid tone)

20) Singular	Plural
[zukwo]	[àzukwo] 'hoes'
[pǎfǐ]	[àpǎfǐ] 'mats'
[bwoknu]	[àbwoknu] 'corridors'
[mùlǎ]	[àmùlǎ] 'weddings'
[munu]	[àmunu] 'eggplants'

Based on the above data, we shall attempt to determine the underlying tone of the plural prefix in order to account for the actual tonal processes that transpire in this kind of prefixation in Gbagyi. As earlier

stated, there are eight possible combinatory tonal patterns of Gbagyi nouns and it is observed that the prefix either bears a low or a high tone. There are therefore two explanatory possibilities in order to ascertain or determine the inherent tonal status of the plural prefix. They may include that the plural prefix is inherently:

- a. A low tone
- b. A high tone

If we assume that the plural prefix underlyingly bears a high tone, then it is presumed that it maintains its inherent high tone when it occurs with H-SH pattern hence, before a high tone or SH-SH pattern hence, before a super high tone as shown in data (13-15) above. However, the assumed underlying high tone of the plural prefix is observed to change to low tone when it occurs in other phonetic contexts, for instance, when it occur with the tonal pattern of MM (hence before a mid), LL (hence before low tone) and HH (hence before high tone) as shown in data (16-20) above.

From the above data, there seems to be a noticeable contradiction, particularly, where the (supposed) underlying high tone of the plural prefix changes to a low tone at one point as in (19) above but stays as high tone at other point as in (13, 14) above when it occurs before a high tone. It therefore becomes necessary that our explanation takes a different direction in order to proffer a more logical solution to this contradiction. An alternative way to determine which amongst the two tones is inherent to the plural prefix is to identify which one of them has the widest scope of distribution. Out of the eight tonal patterns of Gbagyi nouns, high tone occurs in only two environments; with HH pattern (hence, before high tone) and with SH-SH pattern (hence, before super high tone), while the low tone occurs with the M-SH, MM, ML patterns (hence, before mid tone), LL pattern (hence, before low tone) and HH pattern (hence, before high). It is therefore only logical to presume that the low tone is inherent to the plural prefix which changes to high in environments before high and super high. To further account for why these changes occur, consideration is given to the tone value of the TBU that the prefix precedes. For super high tone in SH-SH pattern, it is assumed that the initial super high tone triggers the raising of the prefix tone from its original low to high level and when it occurs with the HH and H-SH pattern, as it totally assimilates the tone value of the initial TBU of the root noun and becomes identical with it.

But again, the earlier identified contradiction resurfaces which poses the question “why does the low tone stay low at some point but changes to mid tone elsewhere when it occurs before a mid-toned TBU of the stem (as shown in 13, 14 & 19)?” and this question serves as the motivation behind further quest for a more logical explanation or solution to this nagging issue in this investigation. The researcher, having made a more careful examination of the above data, proposes that the plural prefix of Gbagyi Nge nouns is inherently toneless which acquires its surface tone through two tone rules, they include the language specific low tone spread (LTS) rule and high tone spread (HTS) rule in that, when the toneless plural prefix occurs in the environment of low tone, that is before tone types other than high and super high, the low-spread rule applies as the low tone of the initial TBU of the stem spreads from right to left unto the prefix. However, in a situation where the prefix occurs before tone type that are higher than low and mid, such as high and super high, the low-spread rule fails to apply as the prerequisite or required environment for the application of low-spread rule is absent, hence, the high tone spread rule comes to play thereby causing the plural prefix to take on a high tone, this implies that the required environment for the application of the high tone spread (HTS) rule is a [-low, -mid] tone bearing unit (TBU), in other words, the initial TBU of the noun must be either high or super high but not low or mid. Having made this observation, it is therefore needful that for this explanation to be accepted as the most justifiable interpretation, it must be able to answer the question posed by earlier attempts. To answer this question, we shall examine the data that represents the identified contradiction as shown in the table below:

Figure: 1: The contradiction of Tonal process in Gbagyi Nge Pluralization

V → [low]/ ---[Mid]	V → [Mid]/ --- [Mid]
[ānāsji] ‘a lot of buying’	[āpītā] ‘legs’
[ābēdā] ‘words’	[āpwūgjā] ‘forms’
[ābēmā] ‘blames’	[āgjēgbmā] ‘snorings’
[ānītala] ‘tongues’	[āzāk wójí] ‘old men’
[ānākā] ‘writings’	[ānīkwózā] ‘females’

(Source: researcher’s native intuition, 2017)

As earlier observed and based on the data in table (1) above, the prefix takes low or high tone when it occurs before a high toned tone bearing unit (TBU) and the researcher presumes that the reason why the

prefix takes a high tone when it occurs before high tone bearing unit (TBU) because as earlier explained, the low-spread rule only applies at [+low] environment, that is, when the prefix occurs before low or mid tone but when it occurs at every other environments (such as before a high or super high tone), the high tone spread rule applies this clearly justifies the data in the right colon of table (1) above. On the other hand, at the environment where the prefix bears a low tone before a high tone, the tone of the initial BTU is suspected to be underlyingly mid and this speculation is based on the fact that the wellformedness constraint (WFC) of the language prohibits a mid tone to precede a high tone at the surface level as far as the nominal words are concerned, this implies that it only permits a MH tone pattern at the underlying level but never at the surface level hence, when the plural prefix is affixed to noun stem, the tonal pattern of MH becomes a hiatus and in a bid to repair this ill-preferred pattern, the final high tone of the noun completely assimilates to the mid tone which as a result becomes raised to the same high level. This implies that the toneless prefix takes on a low tone before the surface HH pattern because it is underlying a MH pattern (which meets the required environment for low-spread) but takes on a high tone before a HH tonal pattern which is also underlyingly a HH pattern (the required environment for high tone spread rule).

It is therefore clear that the suprasegment, tone, plays a crucial role in the plural formation of Gbagyi Nge dialect. It is convincing therefore to report that the plural prefix is underlying toneless which acquires tone either through default mid rule or low-spread rule.

Non-segmental Account of the Tonal Processes in Plural Formation

Before the non-segmental analysis, we shall present the structural description for the forms where the L-spread rule is applicable and where it is not. They are included below:

21) Forms which serve as the environment for the application of L-spread rule

i.	Singular	Plural
	[bwàdà]	[àbwàdà] ‘shoes’
	[dùgba]	[àdùgba] ‘frogs’
	[bàknà]	[àbàknà] ‘fences’
	[bègjà]	[àbègjà] ‘necks’
	[jàwji]	[àjàwji] ‘many maize’
	[dàdà]	[àdàdà] ‘foreheads’
	[nàgbàzni]	[nàgbàzni] ‘pepper plantations’
	[gìwje]	[gìwje] ‘a lot of money’
ii.	Singular	Plural
	[mùla]	[àmùla] ‘weddings’
	[nagjí]	[ànagjí] ‘foods’
	[katá]	[àkatá] ‘lies’
	[kalá]	[àkalá] ‘strengths’
	[kapwù]	[àkapwù] ‘navels’
	[pèfè]	[àpèfè] ‘mats’
	[nāmá]	[ànāmá] ‘tubers of yam’
	[kpedà]	[àkpedà] ‘cemented floors’
	[nàknú]	[ànàknú] ‘rooms’
	[gafè]	[àgafè] ‘kitchens’
iii.	Singular	Plural
	[sniknà]	[àsniknà] ‘irons’
	[tnubwà]	[àtnubwà] ‘ears’
	[fnipà]	[àfnipà] ‘doors’
	[kpedà]	[àkpedà] ‘cemented floors’
	[gnumà]	[àgnumà] ‘catarrhs’
	[znudù]	[àznudù] ‘crosses’
iv.	Singular	Plural
	[bjíamá]	[àbjíamá] ‘child bearings’
	[džékpé]	[àdžékpé] ‘blouses’
	[náká]	[ànáká] ‘writings’
	[násjí]	[ànásjí] ‘a lot of buying’
	[bédá]	[àbédá] ‘words’
	[bémá]	[àbémá] ‘blames’

	[níta]la	[àníta]la ‘tongues’
	[wǐsá]la	[àwǐsá]la ‘fishes’
v.	Singular	Plural
	[zúkwo]	[àzúkwo] ‘hoes’
	[pǐfǐ]	[àpǐfǐ] ‘mats’
	[bwóknu]	[àbwóknu] ‘corridors’
	[mùla]	[àmùla] ‘weddings’
	[munu]	[àmunu] ‘eggplants’

22) Forms which do not comply for the Application of high tone spread rule

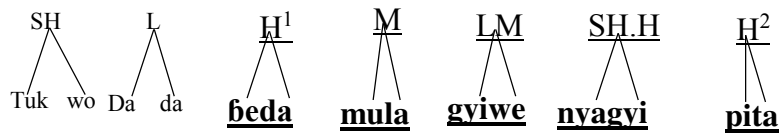
i.	Plural	Singular
	[fǔwǎ]	[áfǔwǎ] ‘houses’
	[ǎkǔ]	[áǎkǔ] ‘pots’
	[túkǔ]	[átúkǔ] ‘heads’
	[kwútá]	[ákwútá] ‘stones’
	[mánájí]	[ámánájí] ‘good ones’
	[kwúwǐ]	[ákwúwǐ] ‘orphans’
	[ńkǎ]	[áńkǎ] ‘teeth’
	[tnútnú]	[átnútnú] ‘works’
ii.	Singular	Plural
	[pítá]	[ápítá] ‘legs’
	[pwúgǎ]	[ápwúgǎ] ‘forms’
	[gǐégbmá]	[ágǐégbmá] ‘snorings’
	[zákǔwǐ]	[ázákǔwǐ] ‘old men’
	[ńkwǔzá]	[áńkwǔzá] ‘females’
	[wǐjída]	[áwǐjída] ‘corn owners’
iii.	Singular	Plural
	[gníkǔ]	[ágníkǔ] ‘markets’
	[ńkǔ]	[áńkǔ] ‘wives’
	[zókǔ]	[ázókǔ] ‘oaths’
	[zákǔwǐ]	[ázákǔwǐ] ‘old people’
	[ńkǔwǐ]	[áńkǔwǐ] ‘old women’

Having presented the forms above, we shall give the non-segmental analysis in the following:

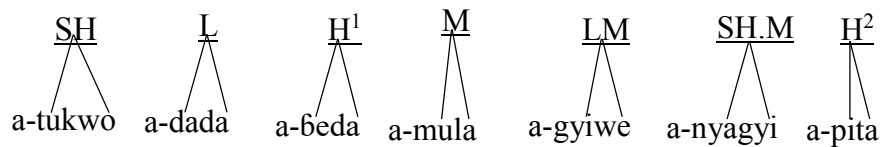
Stem	L	H ¹	M	LM	SH.M	H ²
	dada	beda	mula	gyiwe	nyagyi	pita

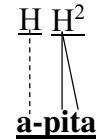
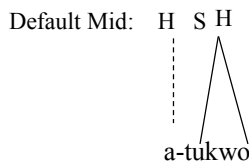
WFC: Tonal tier

Segmental tier

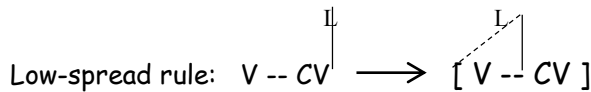
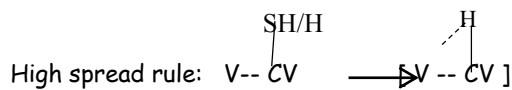
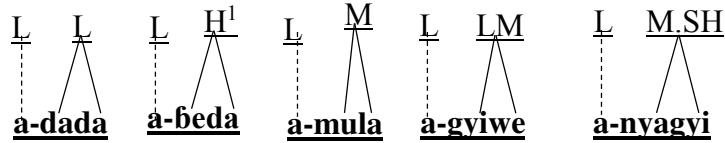


Prefixation:





Low-spread:



Conclusion

This paper was preoccupied with the investigation of tonal processes that are triggered by pluralisation process in Gbagyi Nge. This study observed that in order to mark normal plurality in this dialect, a morpheme is prefixed to the (singular) noun. The tonal processes were ascertained through a thorough examination and identification of the underlying tone of the plural prefix. The paper employed three complicated rules to account for the alternation using the linear framework. However, two rules in non-linear account (L-spread and high-spread) was used which has proven to proffer the most justifiable interpretation for the identified alternations. This paper concludes that the plural prefix is inherently toneless which acquires tone either through L-spread rule or high spread rule. It is therefore right tone conclude that tone though a phonological unit, it bears morphophonemic relevance in Gbagyi Nge pluralisation process.

References

- Akanlig-Pare, G., Kenstowicz, M. (2002). Tone in Buli In: Studies in African Linguistics. Vol. 31, numbers ½.
- Blench, R.M. (2013). The Nupe Languages of West-Central Nigeria: Overview and California press.
- Cahill, M. (1999). "Aspect of the Morphology and Phonology of Konni". Columbus, Ohio: Ohio State University, PhD Dissertation.
- Goldsmith, J. A. (1976). Autosegmental Phonology. PhD Thesis MIT: Massachusetts Institute of Technology.
- _____ (1990). Autosegmental and Metrical Phonology: Oxford: Basil Backwell.
- Hyman, L. M. (2007). Universals of Tone Rules: 30 years later in: Riad, Tomas, Gussenhoven, Carlos (Eds.), Tones and Tunes: Studies in words and sentence prosody. Mouton de Gruyter, Berlin, pp. 1-34.
- McPherson, L. (2017). Multiple Feature Affixation in Seenku Plural Formation. To appear in: Morphology Journal. Dartmouth College.
- Smith, N. V. (1967). The Phonology of Nupe In: Journal of African languages, 6:153-169.