DERIVATION OF NUMERAL AND COUNTING SYSTEM IN TIV

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Abstract
This paper explicates the derivational processes in the Tiv numeral system. The Tiv language has complexity of deriving, especially non-basic numeral involves addition and multiplication in addition to the grammatical processes; drawing from phonological and morphological processes such as compounding, affixation and reduplication which are compiled to yield several numeral forms in the language. In this work, investigation on how the phonemes and morphemes play significant role through variations in the word building processes of the numeral system. The study relies on three major sources in gathering the data for the descriptive analysis namely: compilation of a list of Tiv numbers, the researcher's intuitive knowledge of the language in addition to his training as a linguist, and scholarly works on Tiv numerals in textbooks and journals available. The paper employs the lexical phonology theory to back up its claims on derivational processes of Tiv numeral system. In all, from the available data in this study, Tiv language could be said to belong to the group of languages which have a vigesimal numeral system. This is because the language employs a numeral structure where counting is done majorly in multiples after the basic numeral of one to ten. In all, this paper may not be as exhaustive, but it is hoped that the study have achieved its primary aim of providing a detailed description of the basic derivational processes in the Tiv numeral system in addition to helping upcoming researchers to appreciate the importance of this study in documentation of Tiv language.
Key words: Tiv, numerals, derivational process.

Introduction

The Tiv people were naturally farmers. They technically cultivate yam, cassava, cereals and rear animals like cows, goats, sheep and poultry, while others hunt. As Tiv people became very efficient in farming, they produced a lot from the farm. Then, the need for a counting device became imperative. Initially, Tiv people began to count their farm produce using fingers, which were only Ten in number and they became prone to forgetting the calculated results, since there was no possibility for storage of such results. This geared them towards new inventions and they adopted the use of stones. Stones were very heavy to carry about and to come-by, since they had to travel far and near in search of coloured stones.

The Tiv people being witty in nature, wanted a device that would count, calculate and store results of their farm produce. Consequently, this paved the way for the invention of Azenga. With the aid of this device, they were able to count and keep the results of farm produce. To some extent, the Tiv people used this device to detect the fraud of their wives in consuming eggs in kitchen where poultry were kept. When travelling, a Tiv man would count the number of eggs and tie the Azenga corresponding to the number, and put the results in the Raffia Palm Bag (Ikpyacor), which was a simple traditional storage medium.

The ikpyacor was invented by Adamgbe Adasu Ijôhô Yaga from Kunav lineage of Tiv, in the 1850s to complement the difficulty in getting Lou, which was not affordable by everybody. Subsequently, the Ikpyacor was used as a temporally medium for a short time after which a class of special or crucial

results were finally store in Lou. Lou was the first traditional storage medium and uncommon to everybody.

Upon return, the man would count the number of eggs and then refer to the results of the Azenga he tied before leaving for a journey. When the results did not tally with the corresponding number of eggs, fraud was detected. As the tampering of eggs by women became rampant in such a way as to destroy poultry farm, Tiv people strategically placed a ban on eating of eggs by women.

The Azenga Device

The Azenga device was invented by Chief Abuul benga of Ukan in the present Ushongo Local Government Area of Benue State, Nigeria in 1846. Since man was faced with the problem of counting articles from creation, the introduction of Azenga reduces stress in counting and virtually took over the position of stones, which were very heavy to carry about and at the same time very difficult to come by. The device was used in counting bigger numbers of Tens, Hundreds and Thousands. It was used to perform Mathematical calculations like Addition, Subtraction, Multiplication and Division. The use of this device became famous following its introduction in the then Infancy (Primary) and Colleges (Secondary) schools to teach mathematics.

The Device proved its efficiency owing to the fact that it did not require electricity for its operations. It is light to carry about and had colours to differentiate from the varying numbers it represents. The Azenga mechanism was popularly used in Nigerian Primary and Nursery (Kindergartens) schools to perform arithmetical operations especially in the rural areas of Benue State.

The usage of this device was simple, for instance, in a calculation of One Hundred minus Ten to get the result of ninety. The calculation will follow the separation of Ten Azenga of the system of 100 bundle; the rest will subsequently be computed to get the final result, which in this calculation equals 90. The use of this machine in schools improved the performance of students in mathematics since its invention over the years.

The use of Azenga device was much better when dealing with bigger numbers e.g. census, for it has colours like White, Yellow, Green and Red. The white (Pupuu) was used for counting numbers between 0-9, Yellow (Agbedaang) stands for Tens, Green (Kwer/Kyôn) for Hundreds and Red (Nyian) for Thousands. For example, performing arithmetic like 10+100+1000 = 1110, would only require three Azenga. A typical Tiv man would count Ten (10) and tie and then count Hundred and so on. He will then join them together and count in total to have his result. Hence, Azenga has many properties and characteristics. It uses its length to carry out mathematical functions. The long and short property of Azenga gave it credit in this perspective.

Tiv is a language found in the Middle Belt North Center of Nigeria. Commenting on the origin of Tiv, Ishima (2017) asserts that 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), and 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. Numbers is employed to fulfill 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 distribution 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 (Harford, 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 the basic derivational processes in the numeral system in Tiv. The justification for the study is to explicate the morphological strategies involved in the word-building process of the numeral system in Tiv language. In the same vein, Ishima (2017) again submits that Tiv has a complex numeral system. There is the indigenous numbering system; then the need for expansion and through language contact with other languages where there co-habit e.g. Hausa. The Tiv numeral system consists of: Cardinal, Ordinal and Nominal (Ishima, 2017).

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 contain in Abraham (1940) He treats the Cardinal numerals and distinguished their class systems when used in the ordinal. The next account is contained in Chan (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 remarns that Tiv operates more than vigesimal numeral system and coupled with the fact that Okeke (2013), accounts of the numeral system of the Tiv are not entirely correct reintegrates the fact that relatively little is still know about the Tiv numeral system. This work therefore stands to fill a gap on phoneme and morpheme variations that occur in the word-building process of Tiv numeral system. Ndimele and Chan (2013:27) submit that a numeral system is a writing system for expressing numbers. Generally, a numeral can be described as a sign, mark or symbol used to present a number. However in linguistics, numbers are specific words in a natural language that represent numbers. Numerical denote a class of specific words expressing quantity (Blazek 1999).They are definite words in a natural language that represent numbers (Von Mengden 2010). Numerals are different from numbers and counting (Wiese 2007) numerals are the instantiation of numbers used to specify a set. The defining properties of numbers according to Von Mengden (2010:64) are; first they are properties of sets, and second, the sets of (natural) numbers is a set of element which form an ordered sequence, numerals (systemic) possess the following qualities; they are (1), constitute the numeral system of a language, (2) correspond to the counting words that occur in conventionalized counting sequence, (3) are used recursively as constituents of more complex (higher valued) numerals and, (4)are morphological basis for the formation of a corresponding form of any other type of numeral (i.e. ordinal multiplicative, frequentive ,etc). Counting is also different from numerals.

According to Blazek (1999), numerals exist in all known languages (both the living and the dead). He goes further to note that: it is possible that numerals are the same as the idea of counting, hence, they could have to search no later than beginning the late Paleolithic" (Blazek 1999) the study of numerals has followed the steps of description, structural analysis, and etymological analysis. The earliest complication of numeral system of many language families dates back to 1847 by port. The description of the numeral system of all known languages in the 20th century are the work of Trombetti (1916) and kluge (1937, 1938, 1939, 1941, and 1941-42) Trombetti (1916) contain data which he used to study the similarities existing in the numerals thereby proposing monogenic of all languages. Kluge (1937-42), on the other hand, describes all the known numeral systems in his time but analyzed only the structures that are clear to him. Kluge's data are argued to be "outdated and frequently inaccurate "but they presently

give great insight into the study of numerals. Chan (1998-2011) is the most elaborate study of numeral of all known languages. The above studies are mainly on the description and structural analysis of numeral systems of selected language using comparative-historical linguistic method is done by (blazek 1999). The study is therefore timely as it will be used to document the count systems of the Tiv language thereby promoting revitalization of the language to prevent its counting system from extinction.

Review of Related Literature

This part makes conceptual review, examines scholarly views, opinions, arguments and theories that are vital to this study. The essence is to show the amount of scholarship that is carried out in the area under study and then justify why in spite of this amount of scholarship, this study is still relevant. This section is discussed under the following headings: conceptual review, theoretical review and empirical studies.

Conceptual review

Numbers

Numbers and their uses are very crucial part of the life of man and this point is even more emphasized in the computer age. Man cannot perform his daily activities without using numbers. Ishima (2017) asserts that the concept of numbers 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 fulfill so many values like: enumeration, qualification, designation, or counting. The particular is expressed on the qualification 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 reasons, number is considered as a class of concepts, just like other classes of objects in a 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 numerical system; so named because it stands unique from other parallel systems in the language.

Counting System

Ndimele and Chan (2013:149) observe that counting refers to the method of finding how much or how many by association actions or words to a sequence of objects. It is speculated that counting began soon after humans developed language. Fingers and thumbs provided the nature abacus and informed the decimal systems in history to be based on the number 10. Different cultural groups have developed and adopted a range of ways for representing numbers in accordance with their needs. While some cultures developed both numbers names and symbolic graphemes for representing numbers, most other cultures did not go beyond using specific words (number names) to represent numbers. Depending on what the base number is, a counting system can be binary (base 2), quaternary (base 4), quinary (base 5) sexagesinal (base 6), octal (base 8) decimal (base 10), duodecimal (base 12) and even vigesinal (base 20). In each of these bases, numbers are built up by repeated sign for each group of the relevant base (say 2) followed by another repeated sign 1. (Iloene, 2013).

Ndimele and Chan (2013:326) again assert that numbers and their uses are a very crucial part of the life of man and this point is even more emphasized in the computer age. It has been argued that much of the wisdom that underlie the computer technology was derived from the ancient counting system of the Greeks (box or sand trays used to hold pebbles for counting in 1500 BC), the Orientals (beads string for counting which was the origin of the Abacus circa 1500 BC) and relatively more recently Napier's rods or

Napier's bones used for mechanically multiplying, dividing, and taking square roots used in England around 1617.

Empirical Review

Number

Man uses number in his daily activities either in school, farm, office, market etc. it then means number had been part of man since the beginning of life. Agreeing with this notion, Ishima (2017) asserts that the concept of numbers 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 fulfill so many values like: enumeration, qualification, designation, or counting. The particular is expressed on the qualification 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 reasons, number is considered as a class of concepts, just like other classes of objects in a given language.

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In African, much transaction and comparison is carried on using numbers and how this impact on daily living should be grised for the mill of documentary linguistics. Some of the interesting aspects of numbers, counting and how these relate to daily living can be gleaned from the art of negotiating prices of

items in the market place. Market days determine the calculation of a week in ancient Africa. In Igbo land, a week was four days as market days occur in 4-days cycles. In Akoko land, the week is a five days circle based on market days. The most critical element of counting system in African language as far as the linguistic system is concerned is how the language classifies things and positions numerically (cardinal and ordinal).

Theoretical Framework

This work draws it base on the lexical phonology theory to back up its argument. The theory of lexical phonology is preferred over several morphological theories such as word formation theory, generative phonology theory, and construction morphology theory. This is due to the suitability of the theory to the concept under review. The theory of lexical phonology is a major contemporary theory of phonology developed in the early 1980s by K.P Mohanan, Paul Kiparsky and Steven Strauss. The theory is the one most similar to classical generative phonology. With the emphasis on morphonology, it is a theory in which morphological rules are brought together with in a single framework. It is an approach to phonology that accounts for the interactions of morphology and phonology in the word building process and the approach is based on the insight that much of the phonology operates language. Word formation rules guide the formation of words. These rules combine morphemes to form new words and also called morphonological rules. The lexicon plays a central productive role in the theory of lexical phonology. It consists of ordered levels, which are the domains for certain phonological or morphological processes. In addition, the lexican is a term where scope of language or of a linguistic account of a language that is centered on individual words or units.

Method of Data Collection

The study relies on three major sources in gathering the data for the descriptive analysis namely: Compilation of relevant lists of Tiv numbers, the researcher's intuitive knowledge of the language in addition his training as a linguist, and scholarly works on Tiv numerals in textbooks and journals available.

Discussion of Findings

This section of the work presents the data collected, analyzed and come out with authentic findings to back up all claims. In this part of the work, the data is analyzed as follows: Morphological derivation of traditional basic sets, Morphological derivation through compounding and morphological derivation through republication and finally discussion of findings.

The Correlation between the Universal Concept of Number System and the Class of Number Expression in Tiv Language

There is no doubt that number concept and number process are parts of human endeavors. It is also not in doubt that these two dates back to the origin of human race thus, every race has its system of numbering. For example:

Table 1: Igbo Base Ten Numerals

Out	'one'
Abuo	'two'
Ato	'three'
Ano	'four'
Ise	'five'
Isii	'six'

Asaa	‘seven’
Asato	‘eight’
Itolu	‘nine’
Iri	‘ten’

Source: (Oyebade 2013).

Table 2: Hausa Traditional Numeral System

Daya	‘one’
Biyu	‘two’
Uku	‘three’
Hudu	‘four’
Biyar	‘five’
Shida	‘six’
Bakwai ‘seven’	
Takwas ‘eight’	
Tara	‘nine’
Gooma	‘ten’

Source: (Amfani 2013).

Table 3: Yoruba Basic Numerals

Emi	‘one’
Eji	‘two’
Eta	‘three’
Erin	‘four’
Arun	‘five’
Efa	‘six’
Eje	‘seven’
Ejo	‘eight’
Esan	‘nine’
Ewa	‘ten’

Source: (Oyebade 2013).

Tiv 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 numerals 1-10. This is similar to the languages sampled and shown above. For example see below:

Table 4: Tiv Basic Sets

2.a.	Mom	‘one’
	U-har	‘two’
	U-tar	‘three’
	U-nyiin	‘four’
	U-taan	‘five’
	A-tar atar	‘six’
	U-taan-kar-uhar	‘seven’
	A-nieni	‘eight’
	U-taan-kar-unyiin	‘nine’
	Pue	‘ten’

Source: (Ishima 2017).

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

Odd numbers:

Mom	'one'
U-tar	'three'
U-taan	'five'
Utaan kar u-har 'seven'	
U-taan kar u-nyii	'nine'

To generate odd numbers in the traditional system and 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-harseven/7

4b 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 base line 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 in the first tenses numeral in Tiv and forms the baseline for further derivations.

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

5.a i.	pue kar mom Ten plus one	11 (10 + 1)
ii.	pue kar u-tar Ten plus three	13 (10 + 3)
iii	pue kar u-taan Ten plus five	15 (10 + 5)
iv	pue kar u-taan kar u-har Ten plus five plus two	17 (10 + 5 + 2)
v	pue kar u-taan kar u-nyiin Ten plus five plus four	19 (10 + 5 + 4)

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 examples 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
ii	pue kar u-nyiin	add four to ten = 14
iii	pue kar a-ter-a-tar	adds six to ten = 16
iv	pue kar a-ni-a-ni	add eight to ten = 18

The derivations (5.b.iii and iv) have complex derivational process that involve and 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 make 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) (5.a and 5.b) for both odd and even numbers respectively. The matrix from mom (one/1) to u-taan-kar-u-nyiin (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-kundgber (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, have considered a single unit of twenty plus ten; then: 1b, 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 markers, 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:

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

7.c. a-kundu a-tar gber (i.e. tens or 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 number 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 discus 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).

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 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 it s origin to Hurford (1975). It has to do with the derivation of compound numerals (both the complex and very complex) the strategy which has its root in the generative enterprise. (Chomsky 1957) entails generating all and only well-formed numeral 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.

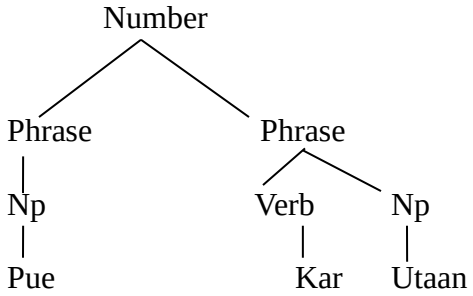
Addition Numerals in Tiv

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 numbers. The Tiv examples include:

16.i. Pue kar mom ‘eleven’
Ten plus one
ii Pue kar u-har ‘twelve’
Ten plus two
iii Pue kar u-tar ‘thirteen’
Ten plus three
iv Pue kar u-nyiin ‘fourteen’
Ten plus four
v Pue kar u-taan ‘fifteen’
Ten plus five.

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

Pue kar u-taan. Through a generalized rule using (16.v) pue kar u-taan;



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 followings:

18. akundu ahar-gber kar u-taan kar unyiin =59
(i.e. 20 tens 2 times also 10 tens add one =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. Hurfords (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.

19.a. Leftward: 2 x 100 = 200 x 100 =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. 1000,000 million mom
b. 2000,000 million u-har
c. 3000,000 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 '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:

21.a. 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:

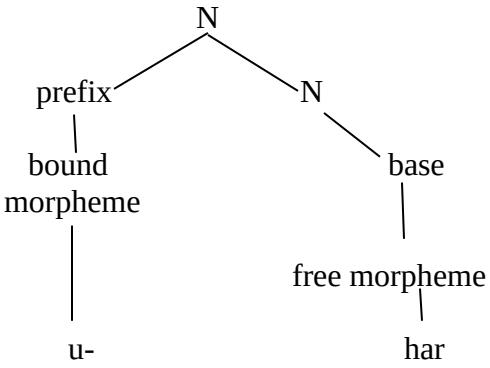
22. million dubu deri uhar = 2000,000,000 (million thousand hundred times two); by multiplicative value, left or right the same value is obtained. With this strategy, the numeral system of Tiv can obtain values up to trillion. (Ishima 2017).

The Morphophonemic Occurrence in the Numeral and Counting System in Tiv Basic Numerals

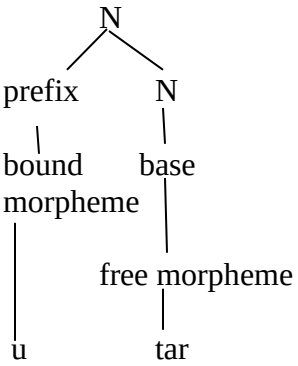
By basic numerals, I mean those numerals that are not derived i.e. numerals whose forms cannot be further broken down into identifiable meaningful morphemes. The first group consists of numerals from one to ten.

1. Mom (one)

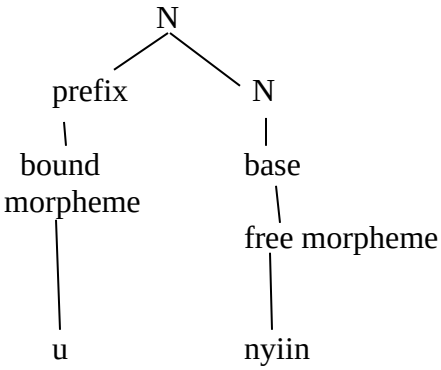
2. u-har (two)



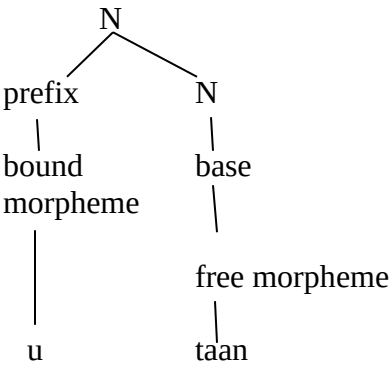
3. u-tar (three)



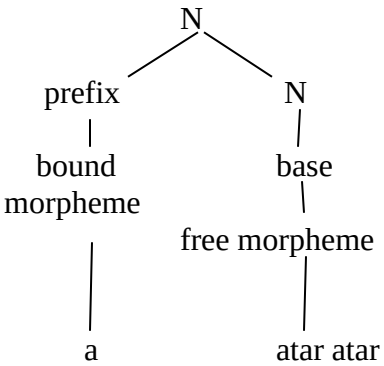
4. u-nyiin (four)



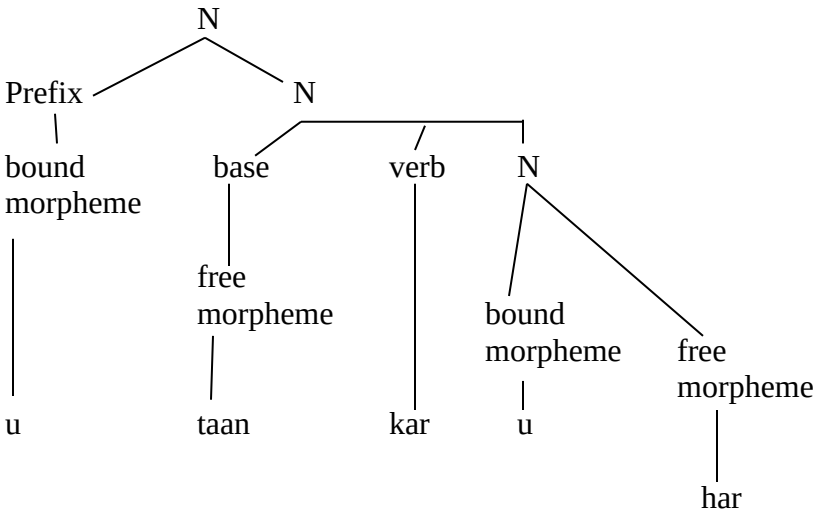
5. u-taan (five)



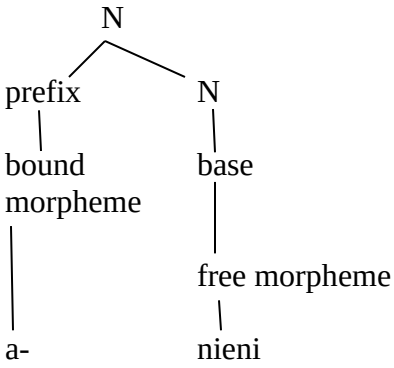
6. a-tar atar (six)



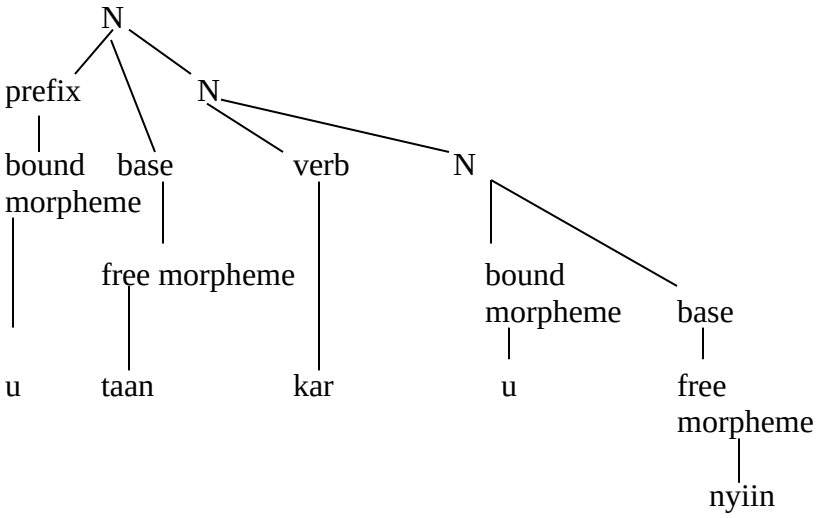
7. u-taan kar u-har (seven)



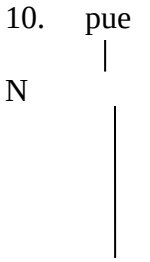
8. a-nieni (eight)



9. u-taan kar u-nyiin (nine)



10.



1.	b.	Mom	'one'
	c.	u-har	'two'
	d.	u-tar	'three'
	e.	u-nyiin	'four'
	f.	u-taan	'five'
	g.	a-tar atar	'six'
	h.	u-taan kar u-har	'seven'
	i.	a-nieni	'eight'
	j.	u-taan-kar-unyiin	'nine'
	k.	Pue	'ten'

To generate numerals in 1.g. u-taan-kar-uhar ='seven' and 1.i. u-taan-kar u-nyiin = 'nine'.

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 base line for the derivation of other units below ten, by selecting either u-har – 2, or u-nyiin – 4, to add up to utaan – 5, derive u-taan kar u-har as well as u-taan kar u-nyiin – 9.

Derived Numerals

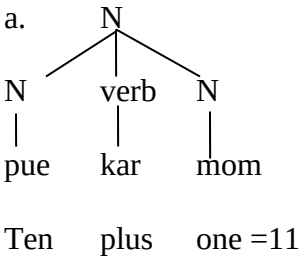
Derivation in the words of Ajiboye (2013) cited O'Grady &Archibald (2008:116), is an affixational process that forms a word with a meaning and/or category distinct from that of its base. As earlier mentioned, Tiv derived numerals are numerals whose forms can be broken down into identifiable morphemes (bound or free) or words. The derived numerals by this definition are predictably more complex. However, they fall into broad classes: morphologically derived numerals comprising copying and compounding and complex numerals that are sentential.

Morphologically Derived Numerals via Copying

Copying in syntax otherwise known as reduplication in phonology and morphology is a process whereby the base is fully or partially copied and attached to the same base to derive new forms (Ajiboye 2013) for instance:

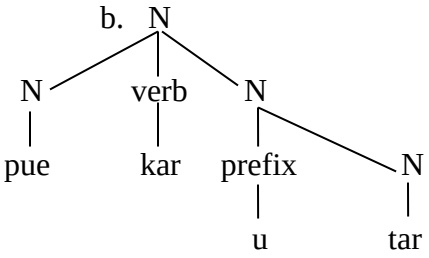
2.	a.	Pue kar mom ten plus one	11(10+1)
	b.	Pue kar u-tar ten plus three	13(10+3)
	c.	Pue kar u-taan ten plus five	15(10+5)
	d.	Pue kar u-taan kar u-har ten plus seven	17(10+7)
	e.	Pue kar utaan kar u-nyiin ten plus five plus four	19(10+5+4)

a.



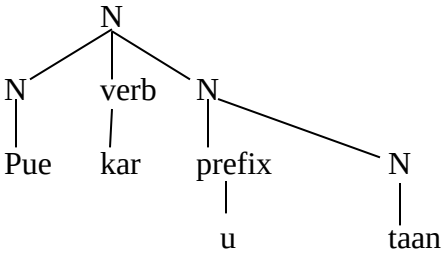
Ten plus one =11

b.



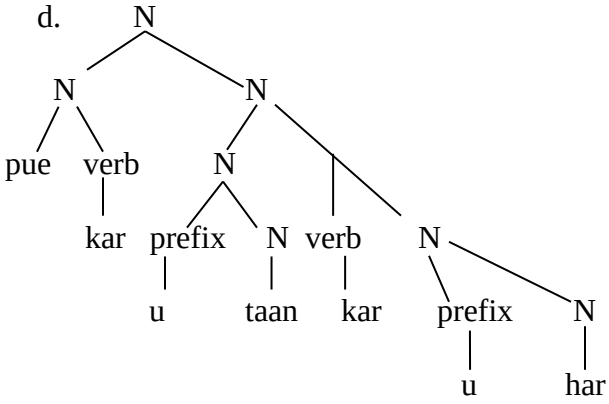
Ten plus three =13

c.



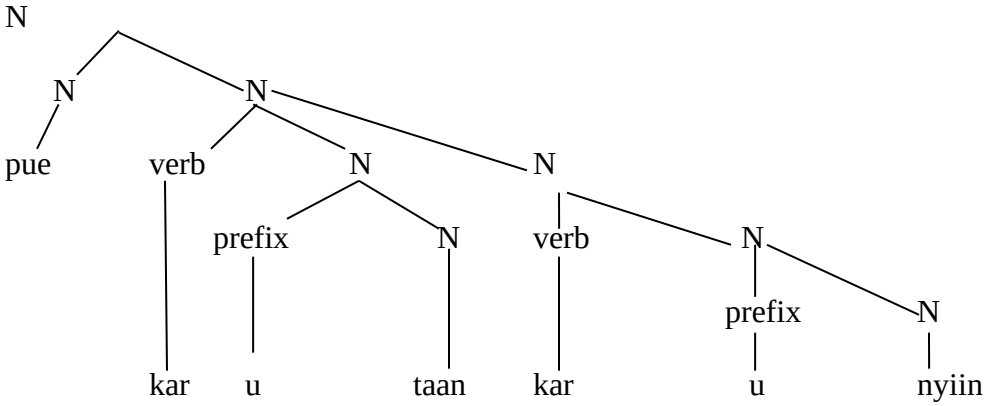
Ten plus five = 15

d.



Ten plus five, plus two = 17

e.



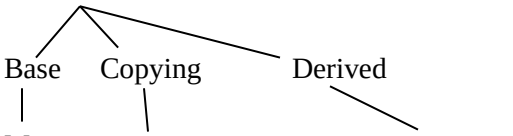
Ten plus five, plus four =19

Full Copying

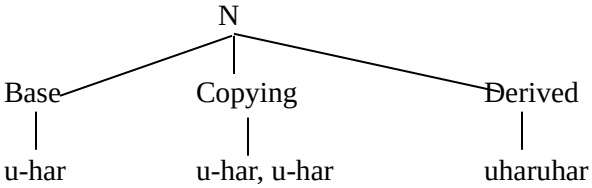
As the name implies, full copying involves copying a complete morpheme or word to the left of the base. In Tiv numeral system, this may be followed by some other phonological processes. The examples given below show that after copying; there is an obligatory application of assimilation rule. In terms of interpretation, the derived numerals have distributive construal .This is in consonance with the principle of word derivation, that 'once formed, derived words become independent lexical items that receive their own entry in a speaker's mental dictionary.

3	Base		Copying	Derived	
a.	mom	'one'	Mom, mom	mommom	'one by one'
b.	u-har	'two'	u-har, u-har	u-haruhar	'two by two'
c.	kundu	'twenty	Kundu,kumdu	kundukundu	'twenty by twenty

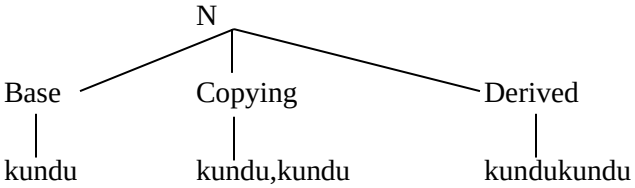
f.
g.



h.
i.



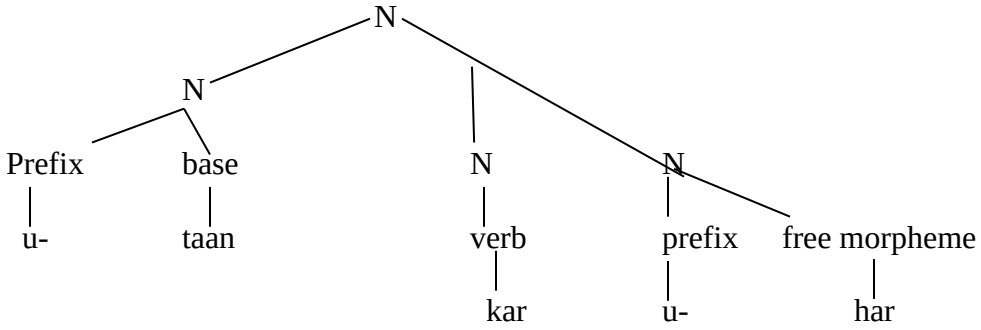
j.
k.



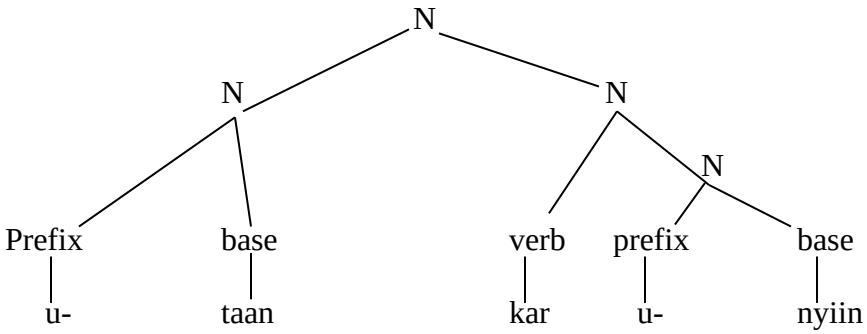
The Methods of Derivation through the Compounding and Duplication Strategy

This mechanism of derivation involves compounding. Compounding is a morphological process of merging two already existing numerals to form a new one. 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. Eg.

4.a. u-taan kar u-har

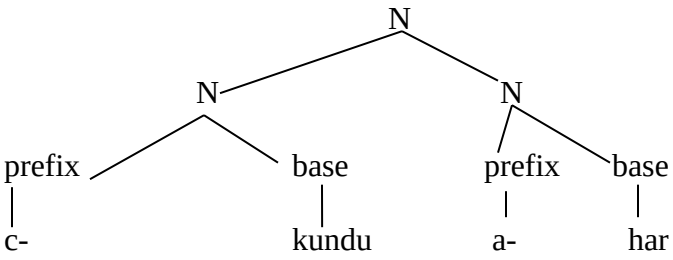


b. u-taan kar u-nyiin = 9

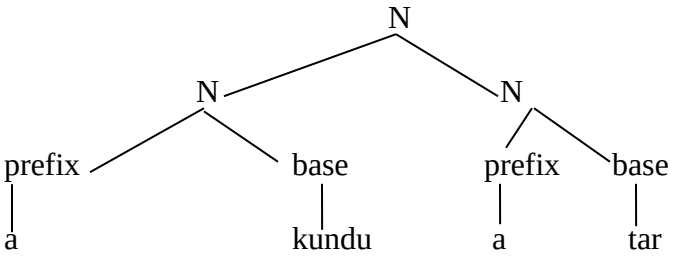


Furthermore, by compounding 20 with other numerals, you can count large quantities. The process is achieved through multiplication as follows:

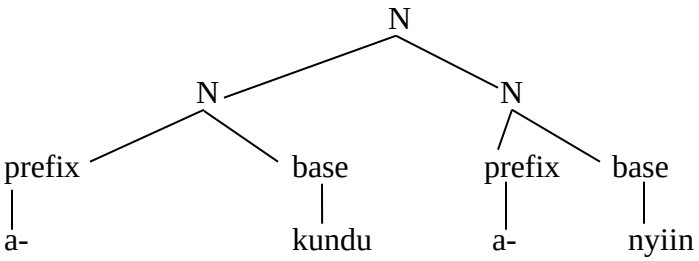
5i. a-kundu a-har = 40 (20x2=40)
ii. a-kundu a-tar = 60 (20x3=60)
iii. a-kundu a-nyiin = 80 (20x40=80)
iv. a-kundu a-taan = 100 (20x5=100)
v. a-kundu pue = 200 (20x10=200)
vi. a-kundu kyundu = 400 (20x20=400)
i. a-kundu ahar = 40



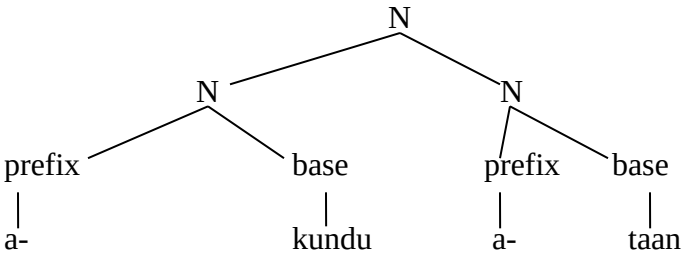
i. A-kundu a-tar = 60



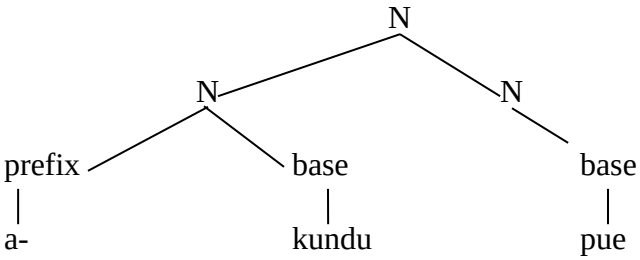
ii. a-kundu a-nyiin = 80



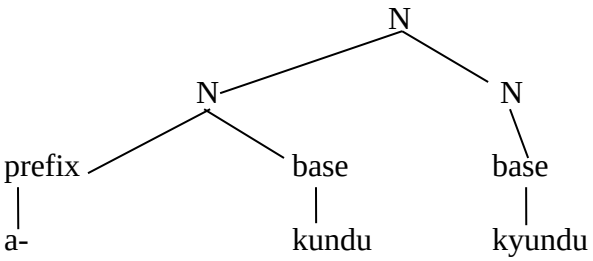
iii. a-kundu a-taan = 100



iv. a-kundu pue



v. a-kundu kyundu = 400

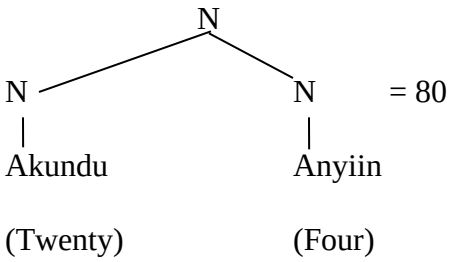


a- kundu kyundu

In the examples (5i-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

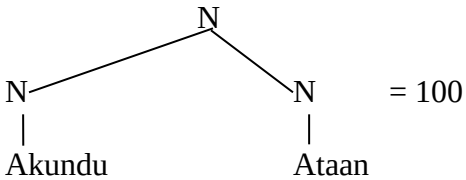
the language which marks concord between the head noun of the compound and the bound element. Diagrammatically, we can have the following:

6a.



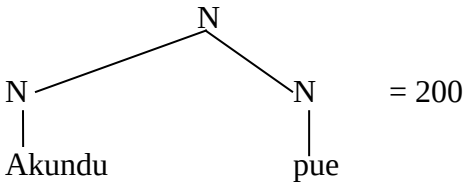
(Twenty) (Four)

b.



(Twenty) (Five)

c.



(Twenty) (ten)

Summary and Conclusion

Thus far, this paper has presented a detailed description of the derivational processes in Tiv numeral system with explanations on the morphophonemic variations that occur in the formation of numerals. The study limits itself to counting from one forty (môm to akundu-ahar) due to lack of space, Tiv has an indigenous system of numeration; Ishima (2007) cites Okeke (2013) and Chan (2010) as a vigesimal numeral system.

This account is partly correct, but does not wholly apply (Ishima 2017). The vigesimal system in Tiv numeral system operates using the ten fingers and toes. Thereafter the system of tens, employ stalking strategy of multiplications. Addition is used in the less complex derivations. No doubt Hurfold'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 as contained in Hurfold's account. (Ishima 2017) This work is not an exhaustive account of the numeral system in Tiv as it is limited to derivational processes. More scholarly attention is required in several other aspects of the Tiv

numeral pattern before it may be assured that enough has been done to numeral and counting system in Tiv.

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