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An Analysis of the Etulo Counting System

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Abstract: This paper examines the numeral system of Etulo, an Idomoid language spoken in Benue state, Nigeria. It discusses the features of the Etulo traditional counting system; as well as an evolving modern counting system which has considerable influence from the decimal system used in Hausa. The modern system of counting is mostly preferred or used by the younger generation of Etulo speakers. Etulo basically adopts the vigesimal system for its traditional counting. Some numerals are formed by compounding and other periphrastic means. Ordinal numbers are derived from cardinal numbers by the expression *onwi*. In the noun phrase, cardinal and ordinal numbers follow the noun and precede the demonstrative. Mathematical processes such as subtraction, addition, and division are mostly expressed by verbs.

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I. INTRODUCTION

Etulo is classified as an Idomoid language of the Benue Congo subgroup of the Niger Congo language family (Armstrong 1989). It is spoken in some parts of Benue and Taraba states in Nigeria. This study focuses on the variety spoken in the Etulo speech community of Adi (Katsina-ala LGA) of Benue state. Etulo coexists alongside some other languages like Tiv, Hausa, Idoma, Igede etc. which are all spoken in Benue state and are more dominant. The Etulo language data analysed in this paper are represented using IPA (International Phonetic Alphabet).

Languages adopt different strategies in building up numeral systems. In a cross-linguistic study, Comrie (2005) groups numeral systems into six types. Among them are the decimal, vigesimal, hybrid vigesimal-decimal and extended body part system. The most common of these systems is the decimal. English and Mandarin for instance, present a decimal system. This is also the case for many languages of Europe. Other languages such as Yoruba, Igbo (West African) and Chukchi (Siberia) operate with a vigesimal system (cf: Comrie 1999). In the traditional system, Etulo adopts the vigesimal system. However, in modern usage, many Etulo speakers, (especially the young generation) use numeral terms attested in other dominant languages such as Hausa and English, which are spoken alongside Etulo in the Benue speech community. Mmadike and Okoye (2008) give a description of a semi modern Etulo numeral system evolving from the counting system of Hausa where terms such as *deli (ideli)* 'hundred' and *dubu (idubu)* 'thousand' are borrowed from Hausa to express higher numerals in Etulo. As for semantics and function, numerals are classified into the cardinal, ordinal and distributive types. Depending on the language, ordinals may be derived from cardinals via morphological and syntactic means (cf: Stolz and Veselinova 2005).

This paper examines the numeral system of Etulo with focus on the distinction between cardinal, ordinal and distributive numerals. The phonological, morphological and syntactic properties of these numerals are established. The most common way of deriving higher numerals in Etulo is by compounding and other periphrastic means.

The rest of the paper is organized as follows: In § 2, I discuss the formation of cardinal numerals; outlining the differences between the traditional and modern counting systems. The derivation of ordinals from cardinal numerals is discussed in § 3.0. In § 4 and 5, distributive numerals and arithmetic operations are briefly discussed. This is followed by the conclusion in §6.0.

II. CARDINAL NUMERALS

Traditionally, Etulo presents a vigesimal system. Base twenty is used consistently, such that forty is expressed as two twenties and hundred as five twenties. In modern usage however, hundred is alternatively expressed by the basic form *ìdèlí* 'hundred' which is borrowed from Hausa. Cardinal numerals in Etulo consist of simple and complex forms. Cardinals realized as simple forms include the numerals 1-10, and 20. Below are some examples:

1) ǫ́níī 'one'
èfà 'two'

ètá ‘three’
énɛ́ ‘four’
èdá ‘five’
ègín ‘six’
ègíàfà ‘seven’
ègíátá ‘eight’
ègíànɛ̀ ‘nine’
ìjúó ‘ten’
òsù ‘twenty’

Cardinal numerals realized as complex forms are derived by either compounding or addition. For numbers such as 50, 70, 90, and other higher numerals, both strategies are involved.

2.1 Cardinal numerals formed by compounding

Some numerals are derived by combining or juxtaposing two other numerals without a linking element. For instance, the numeral *ònwúsɔ̀ èfà* ‘forty’ is derived by combining *ònwúsɔ̀* ‘twenty’ and *èfà* ‘two’. In compounding, *òsù* ‘twenty’ is realized as *ònwúsɔ̀* ‘twenty’[1]. It is not yet clear what sort of process (phonological/morphological) is involved. The literal translation of forty in Etulo would thus be ‘two twenties’. In actual speech, there is assimilation of the final vowel of *ònwúsɔ̀* by the initial vowel of *efa* or any other numeral that follows. With regressive assimilation, *onwusɔ efa* becomes *ònwúsé èfà* ‘forty’. The tone of the assimilated vowel is retained. Below are some examples of cardinal numeral compounds:

2a) ònwúsɔ̀ èfà ‘forty’ (twenty two)
2b) ònwúsɔ̀ ènɛ̀ ‘eighty’ (twenty four)
2c) ònwúsɔ̀ ètá ‘sixty’ (twenty three)
2d) ònwúsɔ̀ èdá ‘hundred’ (twenty five)

2.2 Cardinal numerals formed by addition

Some numerals are derived by adding any numeral to a base of ten or twenty. This is achieved by the use of the verb *dɔ́* ‘add’. This verb is sometimes replaced by its variant dɔ́n especially in the derivation of numerals above forty (3a-e). The numerals 11-19, for instance, are formed by the addition of lower numerals to a base of ten, while 21-39 are derived by adding lower numerals to a base of twenty. In actual speech, the vowel of the verb assimilates to the following vowel.

Table 1

11-19	21-30	31-39
ìjúó dɔ́ ónníī ‘eleven’ ten add one	òsù dɔ́ ónníī ‘twenty one’ twenty add one	òsù dɔ́ íjūō dɔ́ íjūō ónníī ‘thirty one’ twenty add ten add ten one
ìjúó dɔ́ èfà ‘twelve’ ten add two	òsù dɔ́ èfà ‘twenty two’ twenty add two	òsù dɔ́ íjūō dɔ́ íjūō èfà ‘thirty two’ twenty add ten add ten two
ìjúó dɔ́ ètá ‘thirteen’ ten add three	òsù dɔ́ ètá ‘twenty three’ twenty add three	òsù dɔ́ íjūō dɔ́ íjūō ètá ‘thirty three’ twenty add ten add ten three
ìjúó dɔ́ ènɛ̀ ‘fourteen’ ten add four	òsù dɔ́ ènɛ̀ ‘twenty four’ twenty add five	òsù dɔ́ íjūō dɔ́ íjūō ènɛ̀ ‘thirty four’ twenty add ten add ten four
ìjúó dɔ́ èdá ‘fifteen’ ten add five	òsù dɔ́ èdá ‘twenty five’ twenty add five	òsù dɔ́ íjūō dɔ́ íjūō èdá ‘thirty five’ twenty add ten add ten five
ìjúó dɔ́ ègín ‘sixteen’ ten add six	òsù dɔ́ ègín ‘twenty six’ twenty add six	òsù dɔ́ íjūō dɔ́ íjūō ègín ‘thirty six’ twenty add ten add ten six
ìjúó dɔ́ ègíáfà ‘seventeen’ ten add seven	òsù dɔ́ ègìàfà ‘twenty seven’ twenty add seven	òsù dɔ́ íjūō dɔ́ íjūō ègíàfà ‘thirty seven’ twenty add ten add ten seven
ìjúó dɔ́ ègíátá ‘eighteen’ ten add eight	òsù dɔ́ ègiátá ‘twenty eight’ twenty add eight	òsù dɔ́ íjūō dɔ́ íjūō ègíátá ‘thirty eight’ twenty add ten add ten eight
ìjúó dɔ́ ègíànɛ̀ ‘nineteen’ ten add nine	òsù dɔ́ ègíànɛ̀ ‘twenty nine’ twenty add nine	òsù dɔ́ íjūō dɔ́ íjūō ègíànɛ̀ ‘thirty nine’ twenty add ten add ten nine
	òsù dɔ́ íjūō ‘thirty’ twenty add ten	

[1] Some native speakers prefer using the term nwuso in place of onwuso . Examples: nwúsò èfà ‘forty’, nwúsò ètá ‘sixty’ etc. In the derivation of cardinal numerals therefore, the numeral ‘twenty’ is realized as either onwusɔ or nwusɔ.

2.3 Cardinal numerals formed by compounding and addition

Other numerals are derived by compounding and addition. They generally have a base of twenty and include many numerals above forty. Tens based on odd numerals such as 50, 70 and 90 fall under this group. They are constructed with the pattern *XN + Y = Z* where *XN* is the compound numeral, *Y* the added lower numeral and *Z* the resulting numeral. Consider the following examples:

3a) ònwúsɔ̀ èfà dɔ́n ó*ɲ*íī 'forty one'
twenty two add one

b) ònwúsɔ̀ èfà dɔ́n íjūō 'fifty'
twenty two add ten

c) ònwúsɔ̀ ètá dɔ́n íjūō 'seventy'
twenty three add ten

d) ònwúsɔ̀ ènɛ̀ dɔ́n íjūō 'ninety'
twenty four add ten

e) ònwúsɔ̀ èdá dɔ́n ègíátá 'hundred and eight'
twenty five add eight

When the borrowed numeral term *ìdèlí* is used, numerals such as *ìdèlí ètá dɔ́ íjūō* 'three hundred and ten (literal: three hundreds add ten)', *ìdèlí ó*ɲ*íī dɔ́n ègíátá* 'one hundred and seven' are realized.

Following the traditional numeral system of Etulo, one could possibly count (in hundreds) up to 600 in a fairly simple way using a base of twenty. Numerals (in hundreds) above 600 involve more complexity and ambiguity. This is probably one of the reasons why native speakers now resort to the use of *ideli* in the expression of hundreds and *idubu* for the expression of thousands (see Mmadike and Okoye 2008). The table below provides some illustration:

Table 2

Traditional counting system	**Semi-modern counting system (borrowed from Hausa)**
ònwúsɔ̀ èdá 'one hundred' twenty five	ìdèlí ó*ɲ*íī 'one hundred' hundred one
ònwúsɔ̀ ìjúó 'two hundred' twenty ten	ìdèlí èfà 'two hundred' hundred two
ònwúsɔ̀ ìjúó dɔ́ ijuo èdá 'three hundred' twenty ten add ten five	ìdèlí ètá 'three hundred' hundred three
ònwúsɔ̀ òsù 'four hundred' twenty twenty	ìdèlí ènɛ̀ 'four hundred' hundred four
ònwúsɔ̀ òsù dɔ́n èdá 'five hundred' twenty twenty add five	ìdèlí èdá 'five hundred' hundred five
ònwúsɔ̀ òsù dɔ́n íjūō 'six hundred' twenty twenty add ten	ìdèlí ègín 'six hundred' hundred six
udɛ ó*ɲ*íī 'one thousand'	idubu ó*ɲ*íī 'one thousand'

III. ORDINAL NUMERALS

Stolz and Veselinova (2005) observe that in many languages, ordinal numerals are derived from cardinal numerals. Etulo belongs to the category of such languages. Ordinal numerals are derived from cardinal ones by the addition of the morpheme *ònwí*. For instance, the ordinal *onwi onwusɔ efa* 'fortieth' is derived from *onwusɔ efa* 'forty'. This form of derivation excludes the ordinal numeral *'first'*, which is realized by two suppletive forms: *óvúlɛ̀* and *àbábɔ̂*. *Ovulɛ* is exclusively used for kinship terms and functions syntactically as a nominal modifier (constituent of a NP), while *àbábɔ̂* applies to other animate and inanimate entities and is not realized as a constituent of a NP. The use of both ordinals is illustrated below:

4a) ì*ɲ*ànì lì ònwɛ̀ óvúlɛ̄ ḿgbí ánî
PN COP child first POSS 1SG
'Inyani is my first child'

4b) nɛ́nɛ̂ lì àjàtù m̀gbí ánî ònwí ábābɔ̂
this COP car POSS 1SG REL.P first
'This is my first car'

4c) m̀dà ònwí ábābɔ̂ nwí ánî gíá mà kwúlú wà
cow REL.P first REL 1SG:SUBJ buy the die PERF
'The first cow that I bought is dead'

4d) ǹgísɛ̀ ònwí ábābɔ̂
person REL.P first
'The first person'

In the formation of ordinals 2-9, a phonological change is observed. The word initial vowel and tone of the numeral is deleted after *ònwí* and the harmonic vowel [u] is inserted. As an example, *ònwí + èfà = onwufa* 'second'. Other examples are listed in table 2 below.

Table 3 Ordinal numerals

1st - 9th and 20th	**10th - upwards**
óvúlɛ̀/àbábɔ̂ 'first'	ònwí íjūō 'tenth'
ònwí + èfà → ònwúfàn 'second'	ònwí ósú dɔ̄ íjūō 'thirtieth'
ònwí + ètá → ònwútā 'third'	ònwí ónwúsɔ̄ èfà 'fortieth'
ònwí + ènɛ̀ → ònwúnɛ̀ 'fourth'	ònwí ónwúsɔ̄ èfà dɔ́n íjūō 'fiftieth'
ònwí + èdá → ònwúdá 'fifth'	ònwí ónwúsɔ̄ ètá 'sixtieth'
ònwí + ègín → ònwúgīn 'sixth'	ònwí ónwúsɔ̄ ètá dɔ́n íjūō 'seventieth'
ònwí + ègìáfà → ònwúgīāfà 'seventh'	ònwí ónwúsɔ̄ ènɛ̀ 'eightieth'
ònwí + ègíátá → ònwúgīātā 'eight'	ònwí ónwúsɔ̄ ènɛ̀ dɔ́n íjūō 'nintieth'
ònwí + ègíànɛ̀ → ònwúgīānɛ̀ 'ninth'	ònwí ónwúsɔ̄ èdá 'hundredth'
ònwí + òsù → ònwúsû 'twentieth'	

3.1 Cardinal and ordinal numerals as modifiers

In Etulo, cardinal and ordinal numerals may modify the noun in the expression of quantity and hierarchy/position. Etulo falls in the group of languages in which cardinal numerals undergo no change in form as nominal modifiers. As constituents of a noun phrase, the numerals are preceded by the modified noun. In other words, they are post-nominal. There is a relative change in their position (in proximity to the noun) when they co-occur with other nominal modifiers in a NP. For instance, when a cardinal numeral co-occurs with an adjective, it is directly preceded by the adjective (moves farther away from the noun) as in the phrase: *àjàtù òfùfɛ̂ (ŋí) èfà* 'three new cars' (N→Adj→Num). By contrast, in a NP such *àjàtù (ŋí) èfà ńtónénǐ* 'These three cars' where the cardinal co-occurs with another modifier (demonstrative), it is directly preceded by the noun (N→Num→Dem). If for instance, both the adjective *ofufɛ* 'new' and the demonstrative *ntonɛni* are involved as in: *ájàtù òfùfɛ̀ ŋí ètá ńtónénǐ* 'These three new cars', the order realized is N→Adj→Num→Dem. The linking element *ŋi* is optionally used in NPs comprising numerals in modifying function. More examples are given below:

5a) àfɛ̂ òsù
book twenty
'twenty books'

5b) àjàtù òsù dɔ́ íjūō dɔ́ íjūō óŋīī
car twenty add ten add ten one
'thirty one cars'

6a) ònwɛ̀ ònwúgīn
child sixth
'sixth child'

6b) m̀dà ònwútā
cow third
'third cow'

IV. DISTRIBUTIVE NUMERALS

According to Seth (2012), distributive numerals are a derived numeral class which indicates that the modified NP 'is distributed over' some other entity or event. Thus, it is usually translatable into English as '*n* NPs each', '*n* at a time' or '*n* by *n*' (where *n* stands for any numeral). Distributive numerals denote a numerically specified category. They typically answer the question: *how many each?* Etulo distributive numerals are derived by full reduplication of the cardinal numeral. Consider the following examples:

7) éjî ɣá ángwɔ́ mà ènè énè
1PL share yam the four RED
'We shared the yam four by four'

8) èmgbɛ́ ùmákárántá kwúdzɛ̂ èfà èfà
children school stand two RED
'The students stood in twos'

9) á kīē ítsè mà ìjúó íjūō
3PL carry chair the ten RED
'They carried the chairs ten each'

V. ARITHMETIC OPERATIONS

In this section, I briefly examine the manner in which arithmetic operations such as addition, subtraction, multiplication and division are realized in Etulo.[2]As shall be seen in the subsequent subsections, these operations are mostly expressed by verbs, except for multiplication. The result of an arithmetic operation is generally introduced by the copula *lì* 'be'.

5.1 Addition

Addition is expressed by the verb *tu* 'meet'. The use of this verb for addition seems to be common with older speakers. Younger Etulo speakers of Etulo prefer the verb *bɛkɛ* 'join/merge'. Examples:

10a) ǫ́nílī tú èfà lì ètá
one meet two COP three
'one plus two equals three'

10b) èdá tú èdá lì ìjúó
five meet five COP ten
'five plus five equals ten'

5.2 Subtraction

Subtraction is realized by the verb *dúrú* 'remove'. The result is introduced by the copula *lì* 'be', is interchangeably used with the verb *sísí* 'remain'

11a) ènè dúrú èfà lì èfà
four remove two COP two
'Four minus two equals two'

11b) ìjúó dúrú èdá sísí èdá
ten remove five remain five
'Ten minus five equals five'

5.3 Division

Division is expressed by the verb *ɣá* 'share/divide. It co-occurs with the preposition *mi* 'in' in contexts where the dividend precedes the divisor as in (12a). It however functions independently of any other morpheme when the divisor precedes the dividend (see 12b).

12a) ènè ɣá mì èfà lì èfà
four share in two COP two
'Four divided by two equals two'

12b) èfà ɣá ènè lì èfà
two share four COP two
'Two divide four equals two'

5.4 Multiplication

Multiplication involves the use of the noun *àkpé* 'a number of times'. It's semantics in an arithmetic operation connotes the cumulation of the multiplied number in a group of one, two, three or more. In spoken form, there is always assimilation of the final vowel of *akpe* before a numeral. For instance, *akpe oǫ̀ii* becomes *akpo oǫ̀ii* 'once'. The resulting sum is introduced by the copula *li* or the verb *jɛ* 'become'.

[2] Some variations are observed in the realization of arithmetic operations by Etulo native speakers. For addition, some speakers use the verb *bɛkɛ* 'join/merge' together with the preposition *ji* 'with' while others use the verb *tu* 'meet'. The use of *bɛkɛ* is illustrated below:

i) ɛda bɛkɛ ji ɛda jɛ ijuo
five join with five become ten
'five plus five equals ten'

For introducing the corresponding sum realized from arithmetic operations, some informants make use of the copula *li* 'be' while others prefer the use of the verb *jɛ* 'become'.

13a) ìjúó àkpé ètá lì òsù dɔ́ ijuo
ten times three COP thirty
'Ten times three equals thirty'

13b) èfà àkpé èfà lì ènɛ̀
two times two COP four
'Two times two equals four'

5.5 Fraction

Fractions are expressed by means of the preposition phrase *mi ikie* 'from head' and by qualificatives and nouns such as *ajɛ* 'half', *àngájî* 'half', *ìtsítsí* 'short' The last three are specifically involved in the realization of 'half' as a fraction. The choice is conditioned or determined by the semantic feature of the noun. Examples:

14a) ánî gíá ìtístsí óbā ísíkápá
1SG buy short bag rice
'I bought half bag of rice'

14b) àjɛ̀ m̀gbúábā kwúlúū
half animal die
'Half of the animals died'

14c) àdì kíé àngájî ibreadi nū ánî
PN take half bread give 1SG
'Adi gave me half a loaf of bread'

For other fractions, the prepositional phrase is used, as illustrated below:

15) àdì jí úmí ónîī mì ìkíé íjūō ángwɔ́ ḿgbí ánî
PN steal theft one from head ten yam POSS 1SG
'Adi stole one tenth of my yam'

VI. CONCLUSION

The foregoing discussion shows that the traditional numeral system of Etulo which adopts the base of twenty is vigesimal much like what is obtained in some West African languages such as Igbo and Yoruba. Some numerals are formed by compounding and other periphrastic means. The ordinal numerals are derived from the cardinal numerals by the use of the expression *onwi*. The Etulo vigesimal system is however, relatively restricted and not very user-friendly. Deriving numerals above two hundred becomes quite complex with this system. This has motivated the tendency to borrow from other languages. In particular, in order to express higher numerals (hundreds, thousands, millions), a modern numeral system seems to be evolving, which utilizes numerals borrowed from Hausa, such as *ideli* 'hundred', *idubu* 'thousand' etc.

Etulo is on the verge of losing its traditional counting system, which is mostly used by the older generation. The younger generation prefers to use numerals from other dominant languages spoken in their community, such as Hausa and English. In the near future, it remains to be seen if Etulo will combine its vigesimal system with the decimal system of Hausa and English or replace its traditional counting system entirely.

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