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Numeral systems of Fula and Wolof: A comparison of morphosyntactic characteristics

Abstract

The paper presents an overview of Fula and Wolof numeral systems. Fula is represented by six major lects, for which cardinal, ordinal, distributive, fraction, and human forms of numerals are analyzed. Wolof is the closest relative of Fula, and for this language cardinal and ordinal numeral systems are also analyzed. Apart from the numerals themselves, the syntax of the noun phrase which contains a numeral is analyzed for each language. The language contacts and borrowings are also included in the analysis.

Keywords: Fula, Wolof, numerals, syntax, language contact

1. Introduction

The paper presents an overview of the Fula numeral system in comparison to Wolof. Fula (Niger-Congo – Atlantic-Congo – Atlantic – Northern – Senegambian – Fula-Wolof – Fula) is a language continuum dispersed on a large territory of Sub-Saharan Africa. Its westernmost lects[1] are spoken in Senegal and Guinea, and the easternmost ones are reported as far as Ethiopia. Fula is a native language to approximately 25 million speakers and over 40 million more use it as

[1] There is an on-going discussion regarding whether Fula lects are separate languages or dialects of the single Fula language.

a *lingua franca*. Arnott (1970: 3) enumerates six major lects of Fula and around 20 minor ones. Major lects of Fula have grammatical descriptions (although with various degrees of detail), and most of them have at least some data on numerals. However, a comparative study of numeral systems of various lects has not been performed yet. This work accumulates and compares data on all six various and best described lects of Fula divided into three areas: western, central, and eastern. Various sources offer different views of dialectal division, comprising from two to up to six dialectal areas, however, for the purpose of this work three areas, as presented by Koval and Zoubko (1986), seems to be the most convenient division.

The second numeral system analyzed is a numeral system of Wolof. Wolof (Niger-Congo – Atlantic-Congo – Atlantic – Northern – Senegambian – Fula-Wolof – Wolof) is also one of the better described Senegambian languages, and, along with Sereer, considered genetically closest to Fula. Compared to Fula, Wolof is spoken in a much smaller geographical area. It is spoken in Senegal, Gambia, and certain areas of Mauritania. It is a native language to more than 5 million speakers and is a main *lingua franca* in Senegal.

The existing sources of the data are not provided for a complete diachronic analysis, so the main scope of this work is synchronic. However, if at some point it seems necessary, some diachronic considerations will be available.

The following sources of data were used for Fula:

1. Multi-lect sources of data: de Wolf (1995), Koval & Zoubko (1986),
2. Western area:
   – Pular Futa-Jallon (Guinea): Diallo (2000),
   – Pulaar Futa-Tooro (Senegal): (Niang 1997),
3. Central area:
   – Fulfulde Maasina (Mali): Fagerberg-Diallo (1984),
4. Eastern area:
   – Fulfulde Gombe (Nigeria): Arnott (1970),
   – Fulfulde Adamawa (Nigeria-Cameroon): Klingenheben (1963),
   – Fulfulde Diamaré (Cameroon): Noye (1974).

In case of graphic variations, which are common for Fula, the examples were unified according to 1966 UNESCO decisions made in Bamako (UNESCO 1966). However, the sources vary to a certain extent due to the data format. If a source relies on mainly oral data, there is no structural adaptation, and phonetic simpli-

fications are frequent. However, in the sources using written data, the structural information is more preserved, therefore the outcome even for the same dialect can be different. I will offer explications of such cases along the text and in the summary.

Data sources used for Wolof numerals come from Diouf (2009), US Peace Corps (1995), and (Ngom 2003).

The examples used to illustrate internal syntax of the numerals, i.e. numerals only and not agreement, do not require context. All of them are taken from their respective data source for the dialect (unless stated otherwise). The examples of internal syntax have a context and are cited with a respective data source. Those examples for Pular that are unlabeled are either found in a corpus (corpuspulaar.somee.com) or have been elicited from a native speaker.

The article[2] consists of five sections. Section 2 includes descriptions of cardinal numeral systems in six major lects of Fula and their comparison. The cardinal numeral systems have the most differences between lects, and the numeral data found in the language sources covers mostly cardinal numbers. Special attention is paid to both the internal structure of a numeral and to its syntactic interaction with the other parts of the clause. Also, the connection of the numeral system with other languages for every lect is important, as a disperse language like Fula has different contacts for every lect, resulting in some differences in the numeral systems. In Section 3 other series of numerals of Fula are analyzed (i.e. ordinal, distributive, fractal, and human form), again, with internal and external syntax in focus. It is much simpler, as there is almost no difference between the lects in these systems. Section 4 focuses on the numeral system in Wolof. There are two subsections, each of which corresponds to cardinal and ordinal numerals, respectively. Section 5 ofers the results of a comparative analysis between the numeral systems of Fula and Wolof, considering the genealogical and areal factors.

For every part of the numeral system, the internal syntax is examined first. *Internal syntax* (a term coined by Perekhvalskaya and Vydrin (2020: 52)) is "the manner by which compound numerals are combined", i.e. the principles of constructing a numeral itself. This includes all available bases and operations required to form a system.

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[2] Some considerations included in this article coincide with the ones already published in Kosogorova (2021). The present article uses the previously received data and conclusions, adds some more materials, and yields new results.

To define a numeral system, the first step is always to define its base. According to Comrie (1997), a base of a system is "the value *n* such that numeral expressions are constructed according to the pattern ... *xn* + *y*, i.e. some numeral *x* multiplied by the base plus some other numeral". However, there can be (and usually are) multiple bases to a numeral system. In Fula, there are different bases for multiplication (multiplicands) and for addition (augends). There are generally no other arithmetic operations used by internal syntax of a numeral.

The same set of multiplicands and augends is used for every lect of Fula with minor differences, all of which will be described in their corresponding sections.

The numeral system of Fula has, at first sight, a *three-level system* (term coined by Olderogge 1984: 3-4), which means that there are three thresholds (lower multiplicands or augends) used in the system: they are 5, 10, and 20 (see examples below). That makes the base of the whole numeral system a mixed one – quinary, decimal, and vigesimal. In the later sections, it will become apparent that the vigesimal base is not original in Fula, but is a result of language contact.

It is also important to note that, from the semantic point of view, Pular, as well as all Fula lects, uses a *mixed somatic* and *commercial arithmetic base* (terms coined by Comrie 1997: 20). Somatic base is the one which corresponds to natural factors: counting fingers is the most frequent somatic base, but different body parts could also be counted, as well as other perceptible things. Commercial base is usually decimal, and it can go up to large numbers, which is convenient for commercial interactions. Also, it is noteworthy that the increase of digit position in the numeral system is through addition.

Next, a description of external syntax for every part of a numeral system follows. External syntax is a way in which a numeral interacts with the noun it determines (Perekhvalskaya & Vydrin 2020: 52). This includes both the structure of an NP, to which a numeral belongs, and various morphosyntactic processes both in the noun and in the numeral triggered by their interaction. In Fula, this concerns class[3] and humanity. In Wolof, noun class, number, and a position of marking (head or dependent) are in play.

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[3] Fula has a vast noun class system, which, depending on the lect, counts from 20 to 25 noun classes. They encode various grammar characteristics (such as number and humanity), as well as many semantic ones. A noun class is marked by a suffix, which can vary depending of a part of speech, and by initial consonant mutation. Traditionally, a noun class is labeled with a subject pronoun of this class. In glossing, I also prefer to add a number label to every class, i.e. -sgNDE is a singular NDE class affix marker. The rest of the glosses are labeled according to the Leipzig Glossing Rules.

2. Numeral systems of Fula lects

2.1. Pular Futa-Jallon

Pular is the largest lect of the western area, and it is used by about 5 million speakers. However, it is not one of the best described lects. Because of its history, including the language contact variations, it is now one of the most divergent lects from others, both lexically and structurally. The difference between Pular and the rest of the cluster is, for instance, seen in such areas as clause structure and noun class system. Although Fula is a continuum without any definite central standard, the lects have very few structural differences, and such divergence – as the one shown by Pular – is very noticeable.

Numerals 1-9 in Pular (see 1) demonstrate a clear quinary base: 1-5 are simple and 6-9 follow a quinary model.

(1)

1	*go'o*	6	*jeego'o (<jowi e go'o)*
2	*ɗiɗi*	7	*jeeɗii (<jowi e ɗiɗi)*
3	*tati*	8	*jeetati (<jowi e tati)*
4	*nayi*	9	*jeenayi (<jowi e nayi)*
5	*jowi*		

In the languages of the world, a quinary model has a somatic provenance (Blažek 1999: 325), namely a number of fingers/phalanges on a hand. The connection between *jee-* < *jowi* is beyond doubt here. According to Klingenheben (1963: 163), the etymology *jowi* <? *junngo* 'hand' for Fula (as this part of numeral system is uniform for all Fula lects) is also doubtless. Yet, this etymology does not have systemic phonetic correlations in any other part of the language. Pozdniakov (2018: 239) also does not list the connection between the lexemes 'five' and 'hand' as systemic neither for Fula, nor for Wolof, although he does so for other Atlantic languages. This could be explained by the very old age of this transformation, which is indirectly proven by Scott DeLancey (1992: 238), who states that the semantical connection of a quinary base is usually among one of the oldest preserved in a language, as the quinary base itself is the oldest element of a numeral system. Numerals 2-9 have their correlations in various genetically close languages (Koval & Zoubko 1986: 117). Lexeme 'one', as in many other world languages, is grammatically different from others. It will be examined below.

Numerals 11-19 in Pular, as demonstrated in (2), have a mixed quinary and decimal base, and addition as an operation between the digit positions (units and tens) coded with a comitative preposition *e*.

(2)

	10	*sappo*		
	11	*sappo e go'o*	16	*sappo e jeego'o*
	12	*sappo e ɗiɗi*	17	*sappo e jeeɗiɗi*
	13	*sappo e tati*	18	*sappo e jeetati*
	14	*sappo e nayi*	19	*sappo e jeenayi*
	15	*sappo e jowi*		

The numeral *sappo* 'ten' goes up to *sappor-du* 'index finger', which can be used to indicate ten while counting on one's fingers. Noun class affix *-du* can be dropped if a noun is used in a generic sense, which could be a process here. This proves the somatic origin of a decimal base in numbers 11-19, and this system is very easy to combine with a quinary base used for lesser numbers.

Numbers 20-29 also have a mixed base, this time quinary and vigesimal, as can be seen in (3).

(3)

	20	*noogay*		
	21	*noogay e go'o*	26	*noogay e jeego'o*
	22	*noogay e ɗiɗi*	27	*noogay e jeeɗiɗi*
	23	*noogay e tati*	28	*noogay e jeetati*
	24	*noogay e nayi*	29	*noogay e jeenayi*
	25	*noogay e jowi*		

In other lects, *noogay* has another form *noogas*, for which a reconstruction < *no gas-i* 'finished' can be proposed (after Koval & Zoubko 1986: 117), meaning that both fingers and toes have been counted, and there are no more, meaning that the vigesimal base is also somatic.

After that, for the numbers 30-99 (see 4) the system undergoes a change. The base is mixed, with quinary for units and decimal for tens. The operation

between units and tens is still addition, but there is multiplication added to multiply tens.

(4)

30	*cappande tati* (10*3)
31	*cappande tati e go'o* (10*3 + 1)
36	*cappande tati e jeego'o* (10*3 + (5 + 1))
40	*cappande nayi* (10*4)
41	*cappande nayi e go'o* (10*4 + 1)
46	*cappande nayi e jeego'o* (10*4+(5+1))
50	*cappande jowi* (10*5)
51	*cappande jowi e go'o* (10*5 + 1)
56	*cappande jowi e jeego'o* (10*5+(5+1))
60	*cappande jeego'o* (10* (5 + 1))
70	*cappande jeeɗiɗi* (10* (5 + 2))
80	*cappande jeetati* (10*(5 + 3))
90	*cappande jeenayi* (10*(5 + 4))

Note that there is a plural form of *sappo* used in all these forms. *Cappande* belongs to the plural class *Ɗ*E, and in changing class, this lexeme changes both a noun class affix and an initial consonant, which proves that the numeral is derived from a noun, because only original nouns and attributes can change both class markers simultaneously. Formally, all the numerals from 30 and upwards also have somatic bases, but the use of multiplication greatly facilitates the system for commercial use.

The numeral *teemedere* 'hundred' is also formally a noun, as it keeps its singular noun class NDE, and its plural form is *teemeɗɗe* pl*Ɗ*E. It is borrowed to Fula (and other related languages) from Berber languages, where it has the same meaning (Labatut 1981: 97, Faidherbe 1882: 31). Pozdniakov (2018: 240) states that there are no original numerals of 100 and up in Fula, all of them are borrowed. This borrowing for 'hundred' is used in all lects of Fula, including Pular. Tens and units are added to hundreds with a preposition *e*, like the one between tens and units. The necessary number of hundreds is achieved with multiplication:

teemeɗɗe tati e cappande jowi e jeego'o 'three hundred fifty-six' (100*3 + 10*5 + 5 + 1)

Number 'thousand' *wuluure* NDE – *guluuje* ƊE 'thousands' is also a noun, borrowed, most likely, from the Susu numeral *wúlù* (form cited by Shluinsky 2017: 226). Internal syntax of thousands (up to a million) is completely the same as with the hundreds, so there's no need to provide multiple examples here.

The next division of numerals, millions and billions, has divergences throughout the Fula cluster and even within the Pular lect. Traditionally, Pular uses nouns *ujunere*[4] sgNDE 'million' – *ujunaaje* plƊE 'millions' and *ajanere* sgNDE 'billion' – *ajanaaje* plƊE 'billions'. However, with the course of time, French borrowings *million* sgO 'million' – *milionji* plƊI 'millions' and *milyar* sgO 'billion'- *milyarji* plƊI 'billions' spread wider in everyday use. Also, in dome Futa-Jallon dialects *ujunere* also has the meaning 'thousand'. The internal syntax of the numerals stays the same as with the hundreds regardless of the source of borrowing.

External syntax of cardinal numerals is the same for all lects of Fula, so it will only be described once here. A cardinal numeral linearly follows the head noun of the NP as does any other NP modifier except demonstratives. A head noun, which is followed by any cardinal numeral except 1, has to be in one of the plural noun classes (ƊE, ƊI, ƁE or KOY). The numeral does not agree with its head noun in noun class, but it can agree in a very unusual humanity category, which will be discussed in Section 3.4. In (5), there are examples of all plural noun classes in (a-d), and an example of a complex NP to demonstrate a position of a numeral in it. The last example is elicited, while all others are corpus-based. Also, note that examples for ƁE and KOY classes have a human as their NP head, which causes a humanity marker to appear in a numeral (again, it will be discussed in 3.4).

(5) (a) *na'-i* *tati*
cow-CL.ƊI three
'three cows'

(b) *wor-ɓe* *ɗiɗo*
man-CL.ƁE two.PERS
'two men'

(c) *pay-koy* *nayo*
child-CL.KOY four.PERS
'four children'

(d) *bal-ɗe* *jowi*
day-CL.ƊE five
'five days'

[4] Borrowed from Mande languages, e.g. Soninke *wujunere*.

(e) *dii* *lemunee-ji* *an* *bennudi* *tati*
DEM.CL.ƊI orange-CL.ƊI 1.SG.POSS ripe.CL.ƊI three
'these three ripe oranges of mine'.

The only exception of these syntactic rules is numeral 'one', which behaves exceptionally universally. 'One' has two forms in Fula. Its count form *go'o* is used in complex numerals, such as *jeego'o* 'six', or *noogay e go'o* 'twenty-one', or *teemedere e go'o* 'hundred and one', and in counting chain *go'o, ɗiɗi, tati…* 'one, two, three…'. In this case, *go'o* does not change regardless of its surroundings; it does not even have a human form. If, on the other hand, there is an NP or a clause with 'one', then this numeral is used in its class form. A thorough analysis of the class form of 'one' in Pular was offered by Kosogorova (2020), but the outline is that it can syntactically seem one of three parts of speech, while semantically it is still a numeral.

Firstly, and most often, 'one' behaves like an adjective, agreeing with a head noun in noun class. Its structure is similar to an adjective (root + class affix), the choice of class allomorph is also that of an adjective, and it also agrees in initial root consonant, making it a fully functional attribute with a set of roots *goot-/ngoot-/woot-*. The examples of 'one' as an adjective can be seen in (6).

(6) *haytalla **g**oot-**o*** 'one moment' (sgO class)
*hinere **w**oot.e-**re*** 'one nostril' (sgNDE class)[5]
*junngo **w**oot-**o*** 'one hand' (sgNGO class).

Secondly, 'one' can have the function of a pronoun, i.e. it can replace a coreferential noun in a relevant context, as demonstrated in (7).

(7) *wor-ɓe* *tato* *naat-i* *ka* *buruure.*
men-PL.BE three.PERS enter-ACT.PFV PREP forest.SG.NDE
goot-o *yah-i* *ka* *nano*
one-SG.O go-ACT.PFV PREP left
'Three men entered the forest. One [man] went to the left…'

Lastly, on some occasions 'one' has been encountered with a definite article. This is an exclusively nominal feature in Fula. It is far-fetched to call 'one' a noun,

[5] The final vowel of the root, *e*, has no morphological value and doesn't have any relevance here.

because a noun is usually attached to one noun class, but it can be called a substantivized pronoun in such cases as in example (8).

(8) *o* *yiɗunoo* *jinndude* *e* ***gootal***
3.SG.O like-ACT.PFV-RETR wander-ACT-INF PREP **one-SG.NGAL**
debbo *makko* ***ngal***
wife.SG.O POSS.3.SG.O **DEF.SG.NGAL**
'He liked to wander with one of his wife's [sacs (*poorewal NGAL)*]'

2.2. Pulaar Futa-Tooro

Pulaar is a lect of Fula, spoken mainly in Senegal, but also in Guinea and Sierra-Leone. It has about 4.5 million native speakers. Genetically, it is the closest lect to Pular, but historically, it has had more connections with other Fula lects (other than Pular), and therefore, it is currently mid-way between Pular and the others from the syntax and grammar point of view. The difference between Pular and Pulaar in the numeral system is minimal and is largely of phonetic origin. The most points of difference are found in the first ten, demonstrated in (9), as it is the most ancient part of a system.

(9)

	1	*goo*	6	*jeegom*
	2	*ɗiɗi*	7	*jeeɗiɗi*
	3	*tati*	8	*jeetati*
	4	*nay*	9	*jeenay*
	5	*joy*		

Furthermore, the phonetic differences can be found in the lexemes *nooga**s*** 'twenty', *teeme**dd**e* plƊE 'hundreds' and *ujun**d**ere*[6], which, notably, means 'thousand' in Futa-Tooro. Singular form of a hundred and plural form of a thousand are exactly the same as in Pular.

The internal numeral syntax is the same in these two lects, from formation of somatic-base numerals up to hundred to the complex compound numerals with

[6] *Ujun(d)ere* generally means 'million' in Pular Futa-Jallon, however, at least in the Maali dialect it may mean 'thousand'.

borrowed (French or otherwise) bases. The external syntax, as stated above, is also universal for all Fula lects, so there is no need to describe it any further.

2.3. Fulfulde Maasina

Fulfulde Maasina is a lect of Fula spoken in Mali by a little over a million people. The researchers consider it the least affected by language contacts thus preserving the maximum of original, archaic features of grammar structure and lexis. However, for a numeral system, it is not necessarily true. A Fula researcher Christiane Seydou has done a great work of publishing a large amount of original Maasina griot texts; however, apart from these data and one grammar, Maasina is also one of the least described lects of Fula.

Maasina numerals of the first ten have roughly the same internal syntax as the numerals of the lects already described. The only difference can be observed in a syllable structure of 'six', where, like in Futa-Tooro a closed syllable is desirable, and also in the structure of 'seven' and 'eight', where a vowel is dropped to create a geminate. This, however, is not necessarily a lect difference, but a consequence of source form. If an oral source is transcribed, then such form is also possible in western lects, such as Futa-Tooro. If, however, a structure-based form is used, it might have the same appearance in Masina, as in the other lects. The example of the first 9 numerals of the somatic base is in (10).

(10)

1	*go'o*	6	*jeegom*
2	*ɗiɗi*	7	*jeeɗɗi*
3	*tati*	8	*jeetti*
4	*nayi*	9	*jeenayi*
5	*joyi*		

The internal syntax of the numerals up to 'forty' is also similar to that of Pular and Pulaar, which is schematically demonstrated in (11):

(11)

10	*sappo*	26	*noogay e jeegom*
16	*sappo e jeegom*	30	*cappaɗe tati*
20	*noogay*	36	*cappaɗe tati e jeegom*

However, starting from ‘forty’, Maasina has a double set of numerals for counting tens. The units after the tens are counted traditionally in either case. The first set is a system that has been previously described for Pular and Pulaar. It has a commercial system based on multiplication of tens, as demonstrated in example (12). It is very notable that the phonetic processes described for ‘six’ and ‘seven’ do not occur in these numerals if they are a part of a compound numeral, thus formally making the latter closer to the data from other Fula lects.

(12)

40	*cappande nayi*	70	*cappande jeedidi*
50	*cappande jowi*	80	*cappande jeetati*
60	*cappande jeegom*	90	*cappande jeenayi*

The alternative set of numerals has a multi-radical vigesimal base for tens, introducing a different name for every twenty, as shown in (13).

(13)

40	*debe*
41	*debe e goo*
50	*debe e sappo*
51	*debe e sappo e goo*
60	*mali-hemre*
70	*mali-hemre e sappo* / *hemre-sappo-walaa*
80	*hemre*
90	*hemre e sappo*

The source of this system can be traced to Bamana, which is the closest contact of Fulfulde Maasina. In Bamana, there is a *dɛ̀bɛ* ‘fourty’ (Perekhvalskaya & Vydrin 2020: 58), which is, most likely, the source for *debe* ‘forty’ in Maasina[7]. For *mali-hemre* ‘sixty’ Bamana has *mànìnkɛ̀mɛ*, and for *hemre* ‘eighty’ it has *kɛ̀mɛ*, which has itself been borrowed from Soninke (Perekhvalskaya & Vydrin 2020: 60).

[7] There is an alternative explanation proposed by a native Maasina speaker, that connects *debe* ‘forty’ to *deboreedu* ‘a pregnant woman’, however it seems a very dubious conclusion with no sustainable proof.

Also, it is important to notice that the Bamana numeral system, which has been borrowed to Maasina, is now archaic and has been out of use since the middle of the 20th century. The significant age of this borrowing is also suggested by a transformation *kɛ̀mɛ* > *hemre*, where a borrowed numeral/noun has been correctly classified both with an affix marker and with an initial consonant permutation. This only happens if a borrowing has been in the system long enough (Kosogorova 2015: 456). In modern Bamana *kɛ̀mɛ* is 'hundred'.

The lexemes 'fifty', 'seventy' and 'ninety' are created by adding *e sappo* 'plus ten' to the previous lexeme for ten, like in *debe e sappo* 'forty and ten = fifty'. There is an alternative syntax for seventy, which is *hemre-sappo-walla*, lit. 'eighty--ten-without'. This is the only encounter of subtraction use in Fula numeral system, and this is borrowed from the Bamana numeral syntax.

Numerals over a hundred in Fulfulde Maasina are borrowed and have just the same syntax as in Pular and Pulaar. They are less ancient and have a commercial base. Thus, *teemedere* 'hundred' (pl. *teemeɗɗe*) is the same as in every other lect of Fula, and *ujunere* 'thousand' (pl. *ujunaaji*) is only different from Pular Futa-Jallon.

2.4. Fulfulde Gombe

Fulfulde Gombe is a Fula lect that can be attributed to both central and eastern dialectal areas of Fula. Some researchers (Hammarström 2020) list this lect as a part of an eastern lect Fulfulde Adamawa, but the researchers who work directly with Gombe, namely Arnott (1970: 4), think of it as a separate lect belonging to a central area. It is spoken by 0.5 million people in Nigeria.

The numeral system of Fulfulde Gombe has a set of particularities, which can be divided into phonetic and syntactic. The phonetic ones include the forms of 'tens' (*shappanɗe* vs. *cappanɗe*) and 'hundred' *teemerre* NDE. One can also mark a glottal stop before initial vowels in the original source of Gombe data, which I did not reflect in this research. However, a glottal stop before the initial vowel is omnipresent in every lect of Fula because the syllable structure requires an onset, and in case of borrowed lexemes starting with a vowel, the language adds a glottal stop as an onset. This initial glottal stop is not reflected in writing nowadays, so I did not include it in the examples. The structural particularities of Fulfulde Gombe include the syntax of 'twenty' and 'thousand' and an alternative system of tens. (14) demonstrates a set of Gombe numerals 1-19.

(14)

				10	*sappo*		
1	*go'o*	6	*jeego'o*	11	*sappo e go'o*	16	*sappo e jeego'o*
2	*ɗiɗi*	7	*jeeɗiɗi*	12	*sappo e ɗiɗi*	17	*sappo e jeeɗiɗi*
3	*tati*	8	*jeetati*	13	*sappo e tati*	18	*sappo e jeetati*
4	*nayi*	9	*jeenayi*	14	*sappo e nayi*	19	*sappo e jeenayi*
5	*jowi*						

As can be seen from above, numbers 1-19 have no difference from other lects. However, after that the somatic base is diluted with the commercial features. This is partly because the speakers have partially abandoned their traditional occupation of nomadic pastoralism and transferred the main occupation to trade. Below in (15), there are two sets of numerals counting tens from twenty and up. The left one is original Fula numerals, and the right one is borrowed from Hausa. Hausa are the main population in Gombe area, the main trade partners of Fula-speaking people, and therefore, their language has the most influence on Gombe. Hausa themselves have their numeral system partly loaned from Arabic, so it makes Fulfulde Gombe accept Arabic loanwords through Hausa. Arabic loans in eastern area of Fula are a very common phenomenon as its influence grows stronger in the Eastern areas of Sub-Saharan Africa, and Fula tends to adhere to Arabic because of the religious and cultural bonds. The western lects of Fula do not show as much of a connection with Arabic.

(15)

	Original Fula lexemes	Gombe< Hausa< Arabic
20	*shappanɗe ɗiɗi*	*ashirin*
21	*shappanɗe ɗiɗi e go'o*	*ashirin e go'o*
25	*shappanɗe ɗiɗi e jowi*	*ashirin e jowi*
30	*shappanɗe tati*	*talaatin*
40	*shappanɗe nayi*	*arba'in*
50	*shappanɗe jowi*	*hamsin*
60	*shappanɗe jeego'o*	*sittin*
70	*shappanɗe jeeɗiɗi*	*saba'in*
80	*shappanɗe jeetati*	*tamaanin*
90	*shappanɗe jeenayi*	*tis'in*

Apart from the alternative systems for tens, it is important to notice that the numeral for 'twenty' in original Gombe syntax is not *noogay/noogas* used in other lects of Fula. Here, one can see a simple multiplication of base, same as with other tens. A question arises of the primacy of these alternatives. Here, we can turn to Perekhvalskaya & Vydrin (2020: 110), who state that for Mande, the vigesimal base is a result of contact with Senufo, Gur, and Kru. It is probable that the existence of a separate vigesimal base for western and central areas of Fula is also a result of the same language contact. And its absence in Gombe is due to the fact that there is no contact with either of these three languages in this lect, and the main contact is with Hausa. If this is true, then the vigesimal base in western and central lects of Fula is secondary to a decimal base with multiplication. This does not contradict the fact that the western lects are considered the origin of the Fulani, because the contact developments of various lects may have occurred after the spread of the language to the Gombe area. However, the theory of simplification by analogy[8], which, admittedly, is a typologically frequent case (as, for example is with Swiss French) is another possible direction of development. It will have to be analyzed using modern field Gombe data.

The lexeme *teemerre* NDE 'hundred' – *teemeɗɗe* ƊE 'hundreds' is, just like in other Fula lects, a loan from Berber, whereas a lexeme used for 'thousand' *dubuure* NDE 'thousand' *dubuuje* ƊE 'thousands' is borrowed from Hausa. The fact that this numeral is also borrowed from Hausa rather than from Mande is indirect proof to the fact that Gombe is the point where Mande influence gives way to Hausa, and one can see the original Fula features stripped of the borrowed features. The external syntax of the cardinal numerals in Gombe does not differ substantially from the other Fula lects, except for the fact that the noun class inventory is a little different here, but it has no direct influence on the numeral system.

2.5. Fulfulde Adamawa

Fulfulde Adamawa is an eastern lect of Fula, which is spoken in Cameroon, Chad, and parts of Sudan by 2 million people. Adamawa numerals are structurally closer to western area than to central one except for the language contact influence results, which is demonstrated by numerals 1-19 in (16) and tens in (17).

[8] As suggested by an anonymous reviewer.

(16)

				10	*sappo*		
1	*go'o/goo*	6	*jeego'o*	11	*sappo e go'o*	16	*sappo e jeego'o*
2	*ɗiɗi*	7	*jeeɗiɗi*	12	*sappo e ɗiɗi*	17	*sappo e jeeɗiɗi*
3	*tati*	8	*jeetati*	13	*sappo e tati*	18	*sappo e jeetati*
4	*nay*	9	*jeenay*	14	*sappo e nay*	19	*sappo e jeenayi*
5	*jowi*						

(17)

20	*noogas*	50	*cappaɗe jowi*
22	*noogas e ɗiɗi*	60	*cappaɗe jeego'o*
30	*cappaɗe tati*	90	*cappaɗe jeenay*

As one can notice, except for the phonetical differences between the lexemes *nay* 'four' and *noogas* 'twenty', the Adamawa numerals up to a hundred are closer to Pular than to any other lect. However, the lexeme *temerre* 'hundred' – *temeɗɗe* 'hundreds' is closest to the one of Gombe, except for the first vowel length (that could be a nuance of the data source or of a speaker). Adamawa *ujunerre* 'thousand' (pl. *ujuneɗɗe*) matches the lexeme used for Futa-Tooro, but for some phonetic divergence. Also, the data source for Fulfulde Adamawa lists *dubuure* 'million' (pl. *dubuuje*). All the higher numerals have the same internal and external syntax as the other lects of Fula.

Additionally, it has to be noted that a completely independent numeral system loaned directly from Arabic is fully functional in the lect along with a traditional one.

2.6. Fulfulde Jamaare

Fulfulde Jamaare is the easternmost of the large lects of Fula. The speakers of this lect have separated from Fulfulde Maasina in the 16th century (Erlman 1983: 16) and now constitute several communities in Eastern Cameroon, comprising about 100 000 people in total.

As Fulfulde Jamaare has very strong genetic connection with Fulufɩde Maasina, their numeral systems also have very much in common, see 1-19 in (18) and some examples of tens in (19). But their common features are limited to the non-borrowed part, as their list of language contacts is very different and so is the contact influence.

(18)

1	*go'o*	6	*joweego*	10	*sappo*		
2	*ɗiɗi*	7	*joweeɗiɗi*	11	*sappo e go'o*	16	*sappo e joweego*
3	*tati*	8	*joweetati*	12	*sappo e ɗiɗi*	17	*sappo e joweeɗiɗi*
4	*nay*	9	*joweenay*	13	*sappo e tati*	18	*sappo e joweetati*
5	*jowi*			14	*sappo e nay*	19	*sappo e joweenay*

(19)

20	*noogas*	50	*cappaɗe jowi*
22	*noogas e ɗiɗi*	60	*cappaɗe joweego*
30	*cappaɗe tati*	90	*cappaɗe joweenay*

The numerals 100 and up share the syntactic principles with the other lects, both internal and external. Hundreds use the same lexeme as other eastern lects *temerre* 'hundred' – *temeɗɗe* 'hundreds'. Thousands have slight morphophonemic changes compared to other lects; however, their syntax, including the noun class, is the same: *ujineere* (pl. *ujineeje*) 'thousand'. It is especially noted in the data source that there is no widespread expression for million in the lect.

This lect, as all the ones in the eastern area, also has a fully functional alternative Arabic system of numerals, which is justified by a close contact of the lect with Arabic.

3. Inflectional and derivational possibilities of numerals

3.1. Ordinal numerals

As in many languages of the world, ordinal numerals are nominal attributes, that are subject to noun class agreement. In case of Fula, based on the form and function of their noun class affix, they can be categorized as adjectives. Ordinal numerals are derived from corresponding cardinal numerals with a suffix *-ab-*. There is one exception in Futa-Tooro lect and another exception, which is universal, is a lexeme 'first'.

This lexeme has a variant *go'ab-CL* (CL is a corresponding class affix), which is transparent structurally and etymologically. However, in all Fula lects, it also has another form *aran(e)-CL*, which is derived from a verb *ar-u-gol* 'to come'.

The numerals ‘second’ and ‘third’ also have alternative forms. They are almost equally distributed in the language. The second one is scarcely lower stylistically and is a result of a phonetical simplification.

(20) *ɗiɗaɓ-CL - ɗimm-CL* ‘second’
tataɓ-CL - tamm-CL ‘third’

All three special forms of the ordinal numerals are only used independently and not in any compound numeral (including 6-8).

The other ordinal numerals also show remarkable uniformity throughout the Fula cluster. The differences between them (other than phonetic and originating in the cardinal system) can be attested to the difference in noun class systems in various lects. The inventory of noun classes varies in different lects, thus making the set of class affixes available for use in ordinal numerals different. There is also a difference in initial inconsonant permutation for various lects, but for the ordinal numerals the connection between the initial consonant and a noun class is different from the standard permutation system found in nouns and attributes, even in the lects where the system is most stable, such as Maasina and Futa-Tooro. For example, in (21a-c), one can see that in all lects, the initial consonant of ‘fifth’ is nasal, but normally these classes require other type of consonant (O requires a plosive consonant and NGE – a fricative one where applicable). In (21d), however, there is a plosive initial consonant where it should be. But since there is no evidence of fricative initial consonants found in any lect, so the conclusion must be that the initial consonant system is not functioning in a usual way for adjectives in Fula ordinal numerals.

(21) (a) Maasina
boobo ***nj****obbo*
child.SG.O fifth.SG.O
‘fifth child’ (De Wolf 1995, T1: 49)

(b) Adamawa
nagge ***(n)j****owaɓe*
cow.SG.NGE fifth.SG.NGE
‘fifth cow’ (De Wolf 1995, T1: 49)

(c) Futa-Jallon
gorko ***nj****owaɓo*
man.SG.O fifth.SG.O
‘fifth man’ (De Wolf 1995, T1: 49)

(d) Futa-Tooro
leggal *jowabal*
tree.SG.NGAL fifth.SG.NGAL
'fifth tree' (Niang 1997: 166)

The pattern for the internal syntax for ordinal numerals can be found below in (22). As can be seen, the ordinal affix can only be attached to the numerals of the first ten and to twenty, i.e. to the last item of a compound numeral.

(22)

1	*go'aɓ-CL* *aran(e)-CL*	6	*jeego'aɓ-CL*[9]	10	*sappaɓ-CL*	20	*noogayaɓ-CL*
2	*ɗiɗaɓ-CL*	7	*jeeɗiɗaɓ-CL*	11	*sappo e go'aɓ-CL*	21	*noogay e go'aɓ-CL*
3	*tataɓ-CL*	8	*jeetataɓ-CL*	12	*sappo e ɗiɗaɓ-CL*	30	*cappande tataɓ-CL*
4	*nayaɓ-CL*	9	*jeenayaɓ-CL*	13	*sappo e tataɓ-CL*	31	*cappande tati e go'aɓ-CL*
5	*jowaɓ-CL*			14	*sappo e nayaɓ-CL*	50	*cappande jeego'aɓ-CL*

There are very few mentions of an ordinal form 'hundredth'. They are: *teemer-eree**jo***[10] for Pular Futa-Jallon, *teemedera**ɓo*** for Fulfulde Maasina and *battoo**wo** teemedere* 'the hundredth participant' for Pular Futa-Tooro. Also, there is a form *teemerree*-**CL** listed in De Wolf (1995, T2: 119), since this source of data is a multi-lect dictionary, the uniformity of this numeral within the language can be stated. If used in a compound numeral, hundreds are left in cardinal forms, and only tens or units (whichever comes last linearly) become ordinal, as demonstrated in example (23). This example is from Futa-Tooro lect, approved by a speaker.

(23) *teemedere e jeenayaɓo* 'hundred and ninth' [100 + 9.ORD]
teemedde ɗiɗaɓo 'two hundredth' [100*2.ORD]
teemedde ɗiɗi e nayaɓo 'two hundred and fourth' [100*2 +4.ORD]

---

[9] Such combination of vowels and a glottal stop often results in a loss of a glottal stop and, consequently, in simplification of resulting hiatus to *jeegaɓ*-CL. It frequently happens in oral spoken sources, regardless of the lect.

[10] Here and henceforth, while using an agreed form of an ordinal numeral, a O-class form is provided, unless stated otherwise.

The attested ordinal forms for 'thousand' are *wulureejo, ujunereejo*[11] or, rarely, *wulurabo* for Pular Futa-Jallon, *ujunebo* for Fulfulde Maasina and *battoowo ujunere* for Pular Futa-Tooro. There is also a mention of *ujunereejo* for Fulfulde Adamawa in De Wolf (1995, T3: 81). A million in its ordinal form is encountered in a source for Pular *ujunereejo* or *millioneejo* and for Maasina *ujunabo*. This leads to a conclusion that there are two patterns for ordinal forms of the borrowed numerals, first one is standard, with an affix *-ab-*, and another one is with a standard adnominal affix *-ee-* used in forming adjectives. The replacement, which is used for this form in Fula-Tooro, is not a regular form in Fula but rather a feature of a specific data source.

3.2. Fraction numerals

The formation of fraction numerals has only been described for Pular Futa-Jallon and Fulfulde Maasina. But the simplicity and uniformity of the process, apart from some expected phonetic differences, allow us to suppose that the other lects of Fula might, to some extent, use the same pattern. The fraction numerals are formed by putting a usual form of ordinal numeral into a diminutive noun class – KUN for Pular and NGEL for Fulfulde Maasina, as demonstrated in (24).

(24) *tatabun* (FJ) *tatabel* (M) 'one-third'
jowabun (FJ) *jowabel* (M) 'one-fifth'

3.3. Distributive numerals

The distributive numerals are described only in the data sources on Fulfulde Gombe and Fulfulde Adamawa lects, and not mentioned in any other sources of data. However, my own field data (supported by the opinion of an anonymous reviewer) shows the same results for Pular Futa- Jallon. Consequently, I presume that the data sources just omitted this aspect, as they are not focused on numerals. Distributive numerals in both descriptions are formed with basic reduplication of the lowest part of a cardinal numeral, as demonstrated in example (25). There is no external syntax involved, as the resulting numeral functions as an adverb, and there is no inflection attributed to this part of speech.

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[11] As has been mentioned previously, there is a dialect variation in use of 'thousand', with *wulluure* used for some dialects and *ujunere* for others. It seems to depend on language contact situation for each particular dialect.

(25) *go'o-go'o* 'one by one'
jowi-jowi 'five by five'
cappande jeeɗiɗi-jeeɗiɗi 'seventy by seventy'

3.4. Human forms of cardinal numerals

The agreement of an ordinal numeral with a head noun is not a typological rarity. However, cardinal numerals in Fula also agree with a head noun in every lect. They do not agree in noun class, but in a very special category attributed only to cardinal numerals, which is *humanity*. There are two noun classes in Fula, which can include plural nouns expressing humans. plƁE is a noun class, which *only* includes people in the plural, whereas plKOY/plKON[12] includes the plural nouns for small objects, including small people, children, etc. If such nouns are used with cardinal numerals (except 'one', because agrees in noun class already), the numerals 1-9 and, in one case, 20 are used in a special human form throughout the cluster.

The nouns of ƁE class require a form of a numeral that ends in *-o*. It is reasonable from the language point of view, as a singular form of any ƁE class noun is found in a singular human O class and is marked accordingly. The human *-ɓe* forms can be found below in (26). Note that 'six' does not have a separate human form, as it is based on a count form of 'one', and 'one' does not change in humanity. The human form for 'twenty' is only described for Fula-Jallon lect. In the lects where the original form *chappande ɗiɗi* is used for 'twenty', the last part of the numeral is put in a human form.[13]

(26)

Two men	*worɓe ɗiɗ-o*	Six men	*worɓe (n)jeego'-o*
Three men	*worɓe tat-o*	Seven men	*worɓe (n)jeeɗiɗ-o*
Four men	*worɓe nay-o*	Eight men	*worɓe (n)jeetat-o*
Five men	*worɓe (n)jow-o*[13]	Nine men	*worɓe (n)jeenay-o*
		Twenty men	*worɓe noogay-o*

If a head noun belongs to KON/KOY noun class, then the human form of a cardinal numeral will have one of the forms presented below in example (27).

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[12] The specific class form depends on a lect.
[13] For the lects that have a functioning initial permutation system, a nasal consonant is required here.

Depending on the lect, there are sgKUN-plKOY variants (for Pular Futa-Jallon) and sgNGEL-plKON variants (for all other lects).

(27)

Two children	*paykoy ɗiɗ-oy* *paykon ɗiɗ-on*	Six children	*paykoy (n)jeego'-o* *paykoy njeego'-o*
Three children	*paykoy tat-oy* *paykon tat-on*	Seven children	*paykoy (n)jeeɗiɗ-oy* *paykon njeeɗiɗ-on*
Four children	*paykoy nay-oy* *paykon nay-on*	Eight children	*paykoy (n)jeetat-oy* *paykon njeetat-on*
Five children	*paykoy (n)jow-oy* *paykon njow-on*	Nine children	*paykoy (n)jeenay-oy* *paykon njeenay-on*

There is an addition to this rule, which I have encountered in Futa-Jallon folk tales. In some cases, the lexemes, which do not belong to the two noun classes described above, can still require a human form of a numeral. It happens if such noun is considered human by the speaker's volition, which is grudgingly allowed by the grammar. There are few examples like (28) below, where the djinns, while normally belonging to a non-human ƊI class, still trigger a human form of a numeral, because they are considered live persons for the purpose of the tale.

(28) *o* *yi'-i* *ton* *jinnaa-ji* *ɗiɗ-o*
3.sgO see-ACT.PFV there djinn-pl I two-PERS
'He saw two djinns there…'

The numerals 'ten' and the borrowed forms of 'hundred', 'thousand', and 'million' do not have human forms. Since a human form agreement in cardinal numerals only expands to more ancient parts of the numeral system using a somatic base and not on the later commercial-use borrowings, it can be presumed that it is also archaic.

4. Numeral system of Wolof

Wolof is another Atlantic language, and it is, along with Sereer, the closest relative to Fula. It is spoken in Senegal by 10 million people and is also a *lingua franca* of Senegal (second-popular language after French). Like Fula (but unlike

most of the other Niger-Congo languages), Wolof is not tonal. Modern researchers divide Wolof into seven closely related dialects: Gambian, Baol, Cayor, Dyolof, Jander, Lebou, and Ndyanger (Torrence 2012, and other sources cited in Eberhard et al. 2020).

There is a significant amount of Wolof language descriptions available nowadays, focusing on various aspects of the language. Yet the data on numerals are very scarce even in the best descriptions. The existing data, however, is sufficient to state that there is a structural unity of the numeral system throughout all the dialects, except Lebou. Lebou is well-known to be a detached dialect, and there is not enough data on its numeral system to include it in this study.

4.1. Cardinal numerals

The cardinal numerals in Wolof are structured in the similar way to the ones of the western lects of Fula, which are less prone to Arabic influence than the eastern ones and are less traditional than the central ones.

The first five cardinal numerals constitute a quinary base, which is used to make all the other numerals up to ten, provided in (29). It is the same for all dialects with the minimal morphophonemic differences. Below, there is a set of such numerals. The version including the parts in parenthesis is for the Gambian Wolof (US Peace Corps 1995), and the version without ones is suitable for other Senegal Wolof dialects (Diouf 2009, Ngom 2003). These dialects are very close and are comprehensible both in written and in oral discourse.

(29)

1	*benn(a)*	6	*juróom benn(a)*
2	*ñaar*	7	*juróom ñaar*
3	*ñett(a)*	8	*juróom ñett(a)*
4	*ñen(en)t*	9	*juróom ñen(en)t*
5	*juróom*		

Although, like in Fula, there is no direct connection of the lexeme ‘hand’ with the numeral ‘five’ in Wolof, without delving into diachronic analysis, a lexeme *yoore* ‘to hold in hand’ can be found in the dictionary. This indirectly proves the historical connection between the lexemes, which has to be presumed from the quinary base. Also, a multi-lexeme forms for the basic numerals is not conventional and can serve as additional proof to the importance of a quinary numeral base.

After the first ten, the numeral system of Wolof, just like the one in Fula, acquires traces of a commercial base in addition to the traditional somatic one, as can be seen in example (30). Thus, the numeral 'sixteen' is a combination of the lexemes 'ten', 'five' and 'one', and like in Fula 'and'/'with' is placed between tens and units.

(30)

10	*fukk(a)*		
11	*fukk(a) ak*[14] *benn(a)*	16	*fukk(a) ak juróom benn(a)*
12	*fukk(a) ak ñaar*	17	*fukk(a) ak juróom ñaar*
13	*fukk(a) ak ñett(a)*	18	*fukk(a) ak juróom ñett(a)*
14	*fukk(a) ak ñen(en)t*	19	*fukk(a) ak juróom ñen(en)t*
15	*fukk(a) ak juróom*		

Starting with twenty and up, multiplication is used to express the number of tens and the units still use the quinary base. Thus, 'twenty-seven' = 2*10 + (5+2). Below in (31), there are examples of all numerals 20-29, and some others from all other tens.

(31)

20	*ñaar fukk(a)*		
21	*ñaar fukk(a) ak benn(a)*	26	*ñaar fukk(a) ak juróom benn(a)*
22	*ñaar fukk(a) ak ñaar*	27	*ñaar fukk(a) ak juróom ñaar*
23	*ñaar fukk(a) ak ñett(a)*	28	*ñaar fukk(a) ak juróom ñett(a)*
24	*ñaar fukk(a) ak ñen(en)t*	29	*ñaar fukk(a) ak juróom ñen(en)t*
25	*ñaar fukk(a) ak juróom*		
30	*ñett(a) fukk(a)*		
31	*ñett(a) fukk(a) ak benn(a) = 3*10 + 1*		
36	*ñett(a) fukk(a) ak juróom benn(a) = 3*10+ (6+1)*		
40	*ñen(en)t fukk(a)*		
41	*ñen(en)t fukk(a) ak benn(a)*		
46	*ñen(en)t fukk(a) ak juróom benn(a)*		
50	*juróom fukk(a)*		

[14] There can be a dialect invariant *ag* of this preposition.

51	*juróom fukk(a) ak benn(a)*
56	*juróom fukk(a) ak juróom benn(a)*
60	*juróom benn(a) fukk(a)*
70	*juróom ñaar fukk(a)*
80	*juróom ñett(a) fukk(a)*
90	*juróom ñen(en)t fukk(a)*

A lexeme 'hundred' in Wolof is a loanword from the same Berber source as in Fula, but it has only one form and does not inflect. Unlike Fula, there is no plural form of 'hundred', and the multiplication is used to describe the number of hundreds, like with tens, as can be seen in (32).

(32) 111 *téémééér ak fukk(a) ak benn(a)* = 100 + 10 + 1
234 *ñaar téémééér ak ñett(a) fukk(a) ak ñen(en)t* = 2*100+3*10+4

The numeral lexeme for 'thousand' has the same provenance in Wolof as in Pulaar Futa-Tooro, which is not surprising as they share most of their area. It has a form *juuni* and the same syntax within a compound numeral as tens and hundreds (33).

(33) 1007 *juuni ak juróom ñaar* = 1000+(5+2)
2080 *ñaar juuni ak juróom ñett(a) fukk(a)* = 2*1000 + (5+3)*10

As can be seen from the above examples, the internal syntax of Wolof numerals is very close to that of Fula. However, the external syntax has several points of difference. In Fula, a numeral within a NP is dependent on the NP head and is linearly placed after it. In Wolof, however, a numeral is located before the noun. Also, there is an affix *-i* attached to a numeral within a NP. According to different analyses, this affix marks the plurality of a noun (Ngom 2003: 48), or the dependent-marking of a numeral as an attribute (US Peace corps 1995: 9). Torrence (2013: 21), on the other hand, describes this affix as a marker of a countable object. The examples of this affix can be seen in (34).

(34) (a) *juróom-i nit*
five-PL man
'five people';

(b) *ñaar-i* *xarit*
two-PL friend
'two friends';

(c) *benn* *xarit*
one friend
'one friend'.

The lack of a plural affix in example (33c) can signify that this affix indeed marks the plurality of a noun. The number of a noun is also expressed with noun class markers that are part of definite articles and pronoun series (the plural noun classes in Wolof are - ñi-class and yi-class).

Harris (2015: 12) notes that the undetermined noun can also use *b-enn* as a marker of indeterminateness 'some kind of', and Torrence (2013: 18) also provides a plural form of such marker using a *yi*-class, which is *yi-enn* 'some kinds of'. Also, according to Harris (2015), a marker of indeterminateness, quantifier or a *numeral* can be placed before a noun in an NP.

4.2. Ordinal numerals

Ordinal numerals in Wolof have, with one exception, a very uniform internal syntax. An affix *-eel* is added to the last element of a cardinal numeral to turn it into ordinal one, as in (35).

(35) 8 *juróom ñetteel*
12 *fukk(a) ak ñaareel*
24 *ñaar fukk(a) ak ñenteel*

If an ordinal numeral is part of an NP, it also receives an affix, which marks the number of the NP head. This affix can be either -i (in case of a plural NP) or -u (in case of a singular NP), as demonstrated in example (36). Torrence (2013: 19) also describes a paradigm of determiners, where these (or rather a homonymous set of) affixes are used to express definiteness and deixis.

(36) (Ngom 2003: 47)

(a) Singular forms:

*ñaar-eel-**u***	*xarit*	*bi*
two-ORD-SG	friend	DEF.CL

'the second friend'

*fukk-eel-**u***	*fas*	*wi*
ten-ORD-SG	horse	DEF.CL
'the tenth horse'		
*ñett-eel-**u***	*rééw*	*mi*
three-ORD-SG	country	DEF.CL
'the third country'		

(b) Plural forms

*ñaar-eel-**i***	*xarit*	*bi*
two-ORD-PL	friend	DEF.CL
'the second friends'		
*fukk-eel-**i***	*fas*	*wi*
ten-ORD-PL	horse	DEF.CL
'the tenth horses'		
*ñett-eel-**i***	*rééw*	*mi*
three-ORD-PL	country	DEF.CL
'the third countries'		

The only exception from this syntax is, expectedly, the numeral 'one', which has a suppletive ordinal form *(n)jëkk* < *jëkka* 'to be first'. The external syntax of the lexeme 'the first' also differs from the rest of the ordinal numerals. Unlike the others, where a number of an NP head is marked in a numeral, the lexeme 'the first' does not change, whereas the definite article of the head noun is marked with an affix *-u.* Also, the word order in the NP is changed: the dependent noun is placed before the numeral head and not vice versa.

(37) (Ngom 2003: 49)

(a) Singular forms

jigéén	*j-u*	*njëkk*
woman	DEF.CL-REL	first
'the first woman'		
xale	*b-u*	*njëkk*
child	DEF.CL-REL	first
'the first child'		
fas	*w-u*	*njëkk*
horse	DEF.CL-REL	first
'the first horse'		
nit	*k-u*	*njëkk*
man	DEF.CL-REL	first
'the first man'		

(b) Plural forms

jigéén	*n-u*	*njëkk*
woman	DEF.CL-REL	first
'the first women'		
xale	*y-u*	*njëkk*
child	DEF.CL-REL	first
'the first children'		
fas	*y-u*	*njëkk*
horse	DEF.CL-REL	first
'the first horses'		
nit	*n-u*	*njëkk*
man	DEF.CL-REL	first
'the first men'		

Ngom (2003: 40) mentions that the numeral 'first' in the NP has morphosyntactic properties similar to an adjective. However, Harris (2015: 13) denies the existence of such part of speech as adjectives in the language and interprets the construction in (38) as a relative one with a stative verb. He also interprets *-u* as a relative marker that attaches itself to a definite article incorporating the noun class (and, consequently, number) marker.

(38) *bal b-u mag*
ball DEF.CL-REL be.big
'a big ball'

Torrence (2013: 106) also calls this construction relative and describes a set of three relative markers encompassing deixis and definiteness markers. Example (39a) presents an indefinite relative marker with neutral deixis, in example (39b), there is a definite relative marker with proximal deixis, and in example (39c) one can see a definite relative marker with distal deixis. If we analyze a NP with a numeral 'the first' as such relative construction, then, objectively, all three types of relative marker could be present in them, depending of the properties of an NP head. However, the data is available only for one marker, and taking into account the overall lack of data on Wolof ordinal numerals, this could be a problem of representation.

(39) (Torrence 2013 : 106)

(a) *u-* relative clause

(u-m)	*póón*	*m-u*	*ñu tóx*	
NDEF-cl	tobacco	CL-**U**	3.PL	smoke

'some tobacco that they smoked'

(b) *i-* relative clause

póón	*m-i*	*ñu*	*tóx*	*(m-i)*
tobacco	CL-**I**	3.PL	smoke	CL-DEF.PROX

'the tobacco here that they smoked'

(c) *a-* relative clause

póón	*m-a*	*ñu*	*tóx*	*(m-a)*
tobacco	CL-**A**	3.PL	smoke	CL-DEF.DIST

'the tobacco there that they smoked'

According to Diouf (2009: 171), all the ordinal numerals in Wolof have a defined function, while 'the first' is the only one to have a determiner function. It agrees with the word-order information presented above and leads to the following conclusions.

First, the numeral 'the first' is not an adjective, but a part of a relative construction. There exists a possibility of such constructions with relative markers also containing *-i* and *-a*, but this data has to be verified. Second, the word order for all the ordinal and cardinal numerals, except 'the first', can only be explained in two ways. Such numerals could be heads of their phrases, which include the dependent noun – and this does not find proof in descriptions of Wolof syntax, so I'll have to disregard this. Or the Wolof numerals use dependent marking of a noun number, because the determiner, which includes the noun class marker (and therefore shows the number of a noun), is not used with numerals.

5. Conclusions

Fula and Wolof are very closely related languages, so originally, they have had a similar numeral system. It is two-stage with quinary and decimal bases using operations of multiplication and addition, which is expressed by prepositions *e* for Fula and *ak* for Wolof (their functions are roughly the same in both languages. The quinary base presumably has a somatic origin, however, this has poor direct evidence synchronically. The decimal base has a commercial origin. The numerals over a hundred are all borrowed, because the original counting system did not operate numbers on such scale. However, despite the system similarity,

these two languages present a set of very pronounced differences in their counting systems.

Geographically, Fula is dispersed on a very vast territory, and every lect has its own set of language contacts that influence it. So, the divergence in the internal syntax of the lects has both phonetic and contact nature. The tables below present a comparative summary of cardinal numeral data for Fula and Wolof. Note that in Table 1 for numerals 1-4 in Fula there is very little difference, and all of it can be justified by the type of data used in the source. Such minor variations are presence/absence of a glottal stop in 'one', vowel contraction in 'seven' and 'eight' (based on two and three) and presence or absence of pluralizing *-i* in 'four'.

TABLE 1. Variants for 'one' to 'four' lexemes in Fula lects and Wolof

	Western area		Central area	Eastern area			Wolof
	Futa-Jallon	Futa-Tooro	Maasina	Gombe	Adamawa	Jamaare	
1 (count form)	*go'o*	*goo/-gom*	*go'o*	*go'o*	*go'o / goo*	*go'o/-go*	*benn(a)*
2	*didi*	*didi*	*didi*	*didi*	*didi*	*didi*	*ñaar*
3	*tati*	*tati*	*tati*	*tati*	*tati*	*tati*	*ñett(a)*
4	*nayi*	*nay*	*nayi*	*nayi*	*nay*	*nay*	*ñen(en)t*

Table 2 presents variations for 'five', both dependent and independent. The variation between *-y-* and *-w-* in the independent use can be explained by minor phonetic variations of the data source. On the other hand, the extended form *jowee-* used instead of a contracted for *-jee* in Jamaare can be deemed as a lect variation.

TABLE 2. Variants for 'five' in Fula lects and Wolof

	Western area		Central area		Eastern area		Wolof
	Futa-Jallon	Futa-Tooro	Maasina	Gombe	Adamawa	Jamaare	
Independent	*jowi*	*joy*	*joyi*	*jowi*	*jowi*	*jowi*	*juróom*
In numbers 6-9	*jee-*	*jee-*	*jee-*	*jee-*	*jee-*	*jowee-*	*juróom*

TABLE 3. Variants for higher order numerals in Fula lects and Wolof

	Western area		Central area	Eastern area			Wolof
	Futa--Jallon	Futa--Tooro	Maasina	Gombe	Adamawa	Jamaare	
100SG	*teemedere*	*teemedere*	*teemedere*	*teemerre*	*temerre*	*temerre*	*téémééŕ*
100PL	*teemeddɛ*	*teemeddɛ*	*teemeddɛ*	*teemeddɛ*	*temeddɛ*	*temeddɛ*	-
1000SG	*wuluure*	*ujundere*	*ujunere*	*dubuure*	*ujunerre*	*ujineere*	*junni*
1000PL	*guluuje*	*ujunaaji*	*ujunaaji*	*dubuuje*	*ujuneddɛ*	*ujineeje*	-
1000000SG	*ujunere*				*dubuure*		?
1000000PL	*ujunaaji*				*dubuuje*		?

There are also certain generalizations available for the contact phenomena of Fula and Wolof relevant for the numeral system, summarized in a table below. Wolof, therefore, is placed near Pulaar Futa-Tooro because their geographical positions are similar, and this accounts for the similar set of contacts. Eastern lects of Fula use an alternative counting system loaned from Arabic without any significant changes. Central lects use special alternative systems for counting tens, also loaned. For Gombe, the source of loan is Hausa, and for Maasina, it is Bamana, but not in its modern state: the loan base for this system ceased to actively operate in the 1960's. All the western lects have been in contact with Mande languages, which caused them to borrow a vigesimal base used only for the numeral 'twenty' and pass it on to the eastern lects. For Wolof, the contact consequences have not been very pronounced, except for the borrowed numerals of 100 and up. They have been borrowed from the same languages as Futa-Tooro lect of Fula.

From the point of view of external syntax, Fula and Wolof do not have much in common. Fula numerals are always dependent on the NP head and following it linearly. The cardinal numerals change their humanity category depending on the properties of the head noun, and ordinal numerals agree with it in noun class. The numeral *aran-CL* 'first' has a suppletive invariant, and the numerals 'second' and 'third' have simplified invariants in addition to traditional ones.

TABLE 4. Borrowing patterns in Fula and Wolof numeral systems

	Western area		Wolof	Central area	Eastern area		
	Futa--Jallon	Futa--Tooro		Maasina	Gombe	Adamawa	Jamaare
Vigesimal base < Mande	+	+	-	+	–	+	+
Alternative vigesimal system for tens < Bamana	–	–	-	+	–	–	–
Alternative system for tens < Hausa < Arabic	–	–	-	–	+	–	–
Alternative system < Arabic	–	–	-	–	–	+	+
Borrowed hundreds < Berber	+	+	+	+	–	+	+
Borrowed hundreds < Hausa	–	–	-	–	+	–	–
Borrowed thousands < Susu	+	–	-	–	–	–	–
Borrowed thousands < Mande	–	+	+	+	+	+	+

Wolof numerals, on the other hand, are placed before the NP head along with quantifiers and indefinite articles. And since a noun class (which encompasses number) is not expressed in Wolof noun, the numerals accept an affix, which marks the number of a head noun. This is in accordance with the article, which, if present, also accepts the noun class marker of a head noun. The only exception is a numeral 'the first', which is a stative verb in a relative construction. The relative marker of such construction has noun class, deixis, and definiteness information.

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