

The numeral system of Proto- Niger-Congo

A step-by-step reconstruction

Konstantin Pozdniakov

Niger-Congo Comparative Studies 2



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Abbreviations

Language groups and proto-languages

BC	Benue-Congo
GD	Ga-Dangme
GTM	Ghana & Togo Mountain
Juk.	Jukunoid
NC	Niger-Congo languages
PB	Proto-Bantu
PLC	Proto-Lower Cross
PP	Proto-Platoid
PTB	Proto-Potou-Tano-Bantu
PUC	Proto-Upper Cross
SE	South-Eastern Mande
SWM	South-Western Mande

Others

CL	noun class
CL.SG.	noun class of singular
CL.PL.	noun class of plural
CM	noun class marker
dial.	dialect
PL.	plural
redupl.	reduplicated
SG.	singular.

1 Introduction

1.1 Niger-Congo: the state of research and the prospects for reconstruction

It is quite predictable that the title of this book may be met with skepticism by specialists in the comparative-historical studies of African languages. The first question that may arise is whether a Niger-Congo (NC) reconstruction is achievable at all, considered that the reconstruction of proto-languages underlying particular families and their branches has not been completed (or even properly started, as is the case for some groups and branches of NC). Before we turn to the structure of the book, let us try to answer this fundamental question. To do so, it seems reasonable to very briefly outline the present state of affairs in NC comparative studies.

First, it should be noted that presently there is no general scientific discipline such as “NC comparative studies”. Instead, there are individual researchers who work on particular families, groups, sub-groups or branches of NC. Among these, comparative-historical Bantu studies has flourished the most. However, the Bantu languages comprise only a branch of the Southern Bantoid languages that (together with Northern Bantoid) go back to Proto-Bantoid. Hence Bantu is merely one of 16–17 Bantoid branches, as can be gleaned from the chart below (Table 1.1).¹

The progress of comparative-historical studies of the Bantoid languages has been less impressive than that of Bantu studies. Proto-Bantoid, as well as a number of other proto-languages, goes back to the Proto-Eastern-Benue-Congo. In turn, the latter (along with Proto-Western-Benue-Congo and possibly some other languages that do not belong to these two major groups of Benue-Congo) goes

¹This book does not investigate the genealogical classification of Niger-Congo as a whole, nor of the individual families of this macro-family. The schemes presented here take into account the most well-known classifications (sometimes with small deviations due to the specific purposes of our study). The scheme of Bantoid languages given here is based mainly on the classification in <https://mpi-lingweb.shh.mpg.de/numeral/Niger-Congo-Benue-Congo.htm>. It generally reproduces John Watters’ classification (1989a: 401) with some deviations, which are not considered here.

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Table 1.1: Bantoid languages

Northern Bantoid:	Dakoid	Mambiloid	Fam	Tiba (Fà)
Southern Bantoid:	Bantu	Beboïd	Yemne-Kimbi	Ekoid
	Jarawan	Mamfe	Mbam	Mbe
	Ndemli	Tikar	Tivoid	Wide Grassfields

back to Proto-Benue-Congo (BC). Hence, the Bantoid branch is merely one of 14–15 branches of Benue-Congo, as demonstrated by the chart below (Table 1.2).

The traditional reconstruction of Proto-BC based on regular correspondences between the proto-languages underlying the separate branches listed in Table 1.2 has developed rapidly in recent years. However (and I hope that my colleagues will take no offence at this statement), despite numerous brilliant studies dealing with the subject, this is still a relatively ‘young’ science.

Finally, in addition to Proto-BC there are probably more than ten proto-languages underlying other language families that together comprise the Niger-Congo macrofamily (see Table 1.3).

Most of the works presently available in NC comparative studies do not reach beyond this point. Exceptions are rare, and examples of the comparative-historical approach to the NC reconstruction are few. Moreover, the most significant works of this kind (e.g. those of Westermann 1927, Greenberg 1966, Sebeok 1971,

Table 1.2: Benue-Congo languages

The inventory of Benue-Congo groups is given mainly by Williamson 1989b: 266–269. The main difference in Table 1.2 is that Jukunoid is separated from Platoid, which allows us to better compare the forms of numerals of these groups, as well as the fact that Lufu has been added to isolated languages. The division of the BC into the Western and Eastern branches does not always reflect the genealogical characteristics of languages.

*Western BC	*Eastern BC	Isolated BC
Nupoid	Kainji	Oko
Defoid	Platoid	Akpes
Edoid	Cross	Ikaan
Igboïd	Jukunoid	Lufu
Idomoid	Bantoid	

1.1 Niger-Congo: the state of research and the prospects for reconstruction

Table 1.3: Niger-Congo languages

The grouping of 12 families of NC into 5 geographical zones is convenient for technical purposes of generalization of data. So, it means nothing else. As for a genealogical tree of NC languages, as of today there are insufficient grounds for creating one, in my opinion.

		Dogon		Kordofan
Atlantic	Mande	Gur	Ubangi	Adamawa
Mel	Kru	Kwa	Ijo	BC

etc.) are not that recent and usually date to the middle of the 20th century. Comparative studies of the African macro-families had a jump start but nearly had come to little by the end of the 20th century (important works such as Bendor-Samuel 1989 including Williamson 1988; 1989c are few in this period).

So, what happened?

By the 1990s, our knowledge in the field of African languages had begun to grow exponentially. Hundreds of new language descriptions had been published, and the few dozen experts working in NC comparative linguistics were simply unable to digest this avalanche of new information.

The main problem in the 1960s was that we knew too little. From the 1980s on, we have faced the opposite problem: we know “too much”. Not only do scholars not have enough time to absorb new results, sometimes they do not even have enough time to acquaint themselves with those results. During the last four decades, amidst this dialogue between linguistic knowledge and language data, African linguists have remained in listening mode. But I am convinced that the time has come for linguists to say something new again. Unlike even ten years ago, today we are well equipped to do so.

First, we have really exceptional databases. The best one is the RefLex database elaborated by Guillaume Segerer (Segerer & Flavier 2011-2018). It contains more than one million words from African languages (2017), and each entry contains a link to a PDF file of the corresponding source page. It provides a huge range of information and is maximally user-friendly to comparative linguists: it can be solicited for establishing regular phonetic correspondences, for reconstruction and for ranking reflexes as well as for various kinds of statistical data analysis. This new database is being constantly updated.

A big database is something much more than just a huge amount of data. When a database reaches certain degree of plenitude with respect to the main families and branches of the NC macro-family, it opens up prospects for both working

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with the distribution of words that do exist and with the distribution of **gaps** in postulated cognates. The distribution of filled cells and lacunes is a powerful tool allowing 1) identification of important innovations, 2) targeted searches for unusual phonetic reflexes, 3) detection of diachronic semantic changes and 4) refinement of genealogical classification.

In my opinion, the opportunity to rely on both the apparent cognates as well as on the missing reflexes of reconstructed prototypes in particular languages dramatically changes the approach to the reconstruction itself.

The following case may serve as an illustration to this statement. Suppose we need to assess one of Greenberg's proposals, e.g. a Niger-Congo root meaning 'hill'. Among the reflexes quoted by Greenberg for this root are: "(2) Busa *kpi* 'mountain', Kweni *kpi*; (4) Gã *kpɔ*; Gwa *ogba* 'mountain'; (5) Nungu *agbɔ*, Ninzam (Ninzo) *igbu*. Kordofanian: (2) Tagoi (*c*)*ibe*." (Greenberg 1966: 155). The phonetic correspondences underlying the comparison of these forms will not be discussed here (we will just assume that they are valid), for the main problem is elsewhere. A reader with no access to a representative lexical database on the NC languages is always uncertain about a number of key issues, including:

1. whether the root in question is widely attested in the families and groups for which the author postulates the reflexes?
2. whether the root is present in other NC families and groups and how widely it is attested in them?
3. are there any other roots possibly interpretable as NC terms for 'hill'?

The RefLex database establishes that:

1. there are plenty of forms phonetically similar to those of Greenberg (cf. e.g. Boko (in the same sub-group as Busa) *kpii* 'mountain', Gwari (Nupoid, BC) *ōpé* 'hill, mountain', etc), but the postulated root is at best only marginally attested in the families where Greenberg finds it.
2. The root is absent in other branches and families (even if the proposed phonetic correspondences are approached most liberally), although, if wished, its "reflexes" can be found in any of the NC families, cf. e.g. Ibani (Ijo) *kpókpó* 'hill', etc.
3. Most importantly, several other roots with the meaning 'hill, mountain' are distinguishable in the NC languages. All of them (unlike the one proposed by Greenberg) are valid candidates for the reconstruction of the NC

1.1 Niger-Congo: the state of research and the prospects for reconstruction

prototype. One of these roots is presented in the chart below (Table 1.4) (one could mention some other roots nearby):

Table 1.4: **tɔnd* ‘hill, mountain’ in Niger-Congo

		Dogon tɔrɔ		Kordofan
Atlantic *tɔnd	Mande *tinti, *ton	Gur	Ubangi	Adamawa
Mel tul- ?	Kru tɔdɔ	Kwa tu?	Ijo tɔndɔ	Benue-Congo tɔndà

The exact correspondence between Proto-Bantu (**tɔndà*, zones HJKPMNRS > (?) **dɔndɔ*, zones EGHJKLMNRS), Ijo (Ibani *tɔndɔ*) and Atlantic languages (Atlantic Bak: Manjak *ntɔnda*, Atlantic North: Basari *e-tɔnd*, Bapen *ε-tɔnd*, Laala *tunda*, Fula *tulde*, Wolof *tund*) is reason enough to postulate the root **tɔnd* ‘hill, mountain’ at the Proto-NC level, especially since these languages have apparently been out of direct contact.² In addition, the absence of this root in Gur-Ubangi-Adamawa may prove to be a shared innovation in these languages.

Using the databases, the focus of our research could be redirected toward the basic meaning of the lexemes (rather than on the occasional phonetic similarities between the forms). This approach may help in answering the following question: if a Proto-NC term for ‘mountain, hill’ existed, how did it sound? The answer would probably be as follows: this word could sound like **tɔnd*, **kong/ keng* or **kudu* (‘hill, rock, stone’), but not like *dima* (PB **dimà*, zone EGJ), *mut* (Proto-Jukunoid **muT*) or *pi* (PB *pidi*, zone KLMN).

Upon arriving at these unconventional “results”, one could bring them to the attention of specialists in particular NC languages and branches for further evaluation. Without such professional evaluation there can be no hope for success. Moreover, in recent years it has become evident that this evaluation needs to be collaborative (i.e. made by dozens of specialists working together) for the simple reason that today no specialist can be proficient in the languages of more than one or a maximum of two NC families. Hence, it is important that these specialists are asked questions they can answer, so ideally the approach outlined above

²We shall repeat that nearby there are some other candidates for ‘mountain’ in NC, which we do not treat here.

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should be applied to every family within Niger-Congo. For example, according to the etymological database of the Atlantic languages (Pozdniakov & Segerer 2017 3700 cognates) only **tʷnd* and **thəng* are potentially interpretable as the terms for ‘hill, mountain’ in Proto-Atlantic.

Initially I thought of numerals as of an ideal group of terms to test this approach. On the one hand, the core group of numerals must have existed in Niger-Congo. On the other hand, they represent a relatively compact lexical-semantic group with minimum potential for semantic shifts. My initial question seemed simple: what is the most probable Proto-Niger-Congo root for ‘two’? The term for ‘two’ (being the only numeral on the Swadesh list) is generally recognized as one of the most persistent numerals. Why not try reconstructing it on the basis of the NC evidence? It appeared, however, that such a reconstruction is beset with difficulties, so what was originally intended as an article turned into this very book. The structure of the book is described in the section below. As I hope to demonstrate, this structure is conditioned by specific issues encountered in the course of the reconstruction of NC numerals.

1.2 Sources and the monograph structure

1.2.1 Sources

Numeral terms included in the majority of lexical sources hold a privileged position. The information pertaining to the Niger-Congo numerals is more than extensive, it is nearly exhaustive. In addition to the above-mentioned RefLex database by Segerer-Flavier which contains over 17,000 entries marked as “numeral” (state April 2017)) a number of other databases with expansive coverage of the Niger-Congo languages are available. One of them is the “Numeral Systems of the World’s Languages” database created by Eugene S. L. Chan and edited by Bernard Comrie (Chan) The data regarding the number systems of about 4,300 languages (with hundreds of the Niger-Congo languages among them) is incorporated into it. Two or even three sources (often unique) are accessible for some of the languages via this neatly organized and user-friendly database. Another universal database that provides numerical data is “Numerals 1 to 10 in over 5000 languages” by Rosenfelder. It was consulted to a somewhat lesser extent because it only includes evidence pertaining to the first ten numerals, for which a simplified transcription is used. Finally, a number of unpublished databases that incorporate the evidence of specific Niger-Congo families and groups were consulted, e.g. the etymological databases of Atlantic (PozdniakovSegerer2017) and Mande (Valentin Vydrin).

As a result, a total of 2,200 sources for Niger-Congo languages were used in this study. This raises the issue of references, since it is impossible to provide a complete list of sources for every NC language. The language index at the end of this book lists the nearly 1,000 languages cited. For these 1,000 languages, the main sources I used are indicated in Appendix E. The index of sources in Appendix E is structured according to the NC main families in alphabetical order.

For each language, I provide not only the source(s) that can be found in the bibliography, but also the name of every contributor in Chan's database [Chan]. The list of contributors is many pages long, but their names should be known, even if their data are unpublished. This is the least I can do to express my sincere gratitude to each of them.

1.2.2 Monograph structure

Noun class affixes are present in numerical terms in the majority of the Niger-Congo languages. Many forms that are considered primary at the synchronic level have frozen noun class affixes that are no longer productive. In such cases it is extremely difficult to distinguish the etymological root within a numerical term. Without it, however, both the comparison and reconstruction of roots is impossible. This is why the second chapter of this book is devoted to the study of various uses of noun class markers in numeral terms.

The third chapter deals with the alignment by analogy in numeral systems. As in other languages, numerals represent a lexical-semantic group that is especially subject to alignment by analogy due to its closed structure, where words are associated in a paradigm. A textbook example is the term for 'nine', with Indo-European *n- irregularly reflected in Proto-Balto-Slavic as *d-* (Russian *dev'at* '9' instead of the expected **nev'at*) by analogy with the term for 'ten' (Russian *des'at* '10'). This yielded a minimum pair *dev'at* ~ *des'at* that forms a "class of the upper numerals" within the first ten. Adjacent numerals may be aligned with each other in the NC languages by a similar formal marker. Thus, no satisfactory etymology can be suggested for the forms attested in Mumuye (Adamawa; *ziti* '2' ~ *tati* '3' ~ *děti* '4') without the analysis of alignment by analogy. The issues pertaining to both detection and analysis of such alignments are addressed in Chapter 3.

Chapter 4 offers a step-by-step reconstruction of number systems of the proto-languages underlying each of the twelve major NC families, on the basis of the step-by-step-reconstruction of numerals within each family. The term "reconstruction" related to numerals throughout this book calls for a definition. As mentioned above, the use of this term has been questioned, mainly because sys-

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tems of regular phonetic correspondences between the languages within NC families remain unknown. This is why Kay Williamson opted for the term *pseudo-reconstructions* (marked with # instead of *): “Reconstructions proposed by their authors as based on regular sound correspondences are preceded by an asterisk. Pseudo-reconstructions based on a quick inspection of a cognate set without working out sound correspondences are preceded by a #” (Williamson 1989b: 251). In his numerous online publications Roger Blench uses # as well, but his terminology is different: he prefers the more neutral term of *quasi-reconstructions*. Modern comparative studies of the NC languages is a relatively young science, so the opposition between “real” and “pseudo-/quasi-” reconstructions seems irrelevant to me at this stage. The more so that nearly all of our reconstructions (maybe with the exception of Bantu and some other branches) should be marked with #, including the large proportion of reconstructions allegedly based on the evidence of historical phonetics. On the other hand, I think that many colleagues would agree with the following statement: although we do not know the regular phonetic correspondences between the languages that belong to different NC families, there is hardly any doubt that the NC root for ‘three’ sounded something like *tat*.

Throughout this book the term “step-by-step reconstruction of number systems” (e.g in the Atlantic family) is used in reference to the method that includes the following steps:

1. While comparing the forms of numerical terms attested in the languages under study, their most likely prototypes were established within both of the Atlantic groups, i.e. Northern (Proto-Tenda, Proto-Jaad-Biafada, Proto-Fula-Sereer, Proto-Wolof, Proto-Cangin, Proto-Nalu-Baga Fore-Baga Mboteni) and Bak (Proto-Joola-Bayot, Proto-Manjak-Mankanya-Pepel, Proto-Balant, Proto-Bijogo).
2. On the basis of these prototypes, the most likely forms of Proto-Northern Atlantic and Proto-Bak Atlantic numerals were suggested.
3. On the basis of these more ancient forms, the most plausible reconstruction of Proto-Atlantic numerals was offered.

Chapter 5 deals with the reconstruction of the Proto-Niger-Congo numeral system on the basis of the step-by-step-reconstructions offered in Chapter 4 for each of the twelve major families and a handful of isolates. The reconstruction described in Chapter 5 inspired the analysis of the distribution of reflexes of the

NC proto-forms within each of the twelve families (as well as within the isolates) in order to establish:

1. the most archaic NC families / groups / branches (i.e. those that preserve the inventory of Proto-NC forms most fully);
2. NC families / groups / branches that are the most distant from Proto-Niger-Congo in what pertains to the reflection of numerals.

The results of this analysis are presented in Chapter 6.

To illustrate the logic of the complex structure of the monograph, let us consider one example.

In Chapter 4, along with other NC families, the numerals of the Atlantic languages are analyzed (§4.12). Atlantic languages are divided into two main groups – North Atlantic (§4.12.1) and Bak Atlantic (§4.12.2).

In Sections §4.12.1.1–§4.12.1.7, systems of numerals are considered consecutively in the seven main subgroups of the North Atlantic languages. In particular, in §4.12.1.3, numerals in the Jaad-Biafada subgroup are considered and it is established that in these languages, for the numeral ‘10’, the form **-po* is attested. In the final section of §4.12.1, namely in §4.12.1.8 the forms of numerals in the seven northern subgroups are compared, and in particular it is concluded that for Proto-Northern Atlantic, the most probable reconstruction for the numeral ‘10’ is the reconstruction of **pok*.

In Sections §4.12.2.1–§4.12.2.4, the numeral systems in each of the four subgroups of the second Atlantic group, namely Bak, are discussed consecutively. The final section concerning the Bak group (§4.12.2.5) concludes that the only candidate for reconstructing ‘10’ in the Proto-Bak (in addition to the possible model $10 = 5 * 2$) is the root **-taaj*.

In the final paragraph of §4.12, namely in §4.12.3, the systems of the North Atlantic languages and the Bak Atlantic languages are compared. This paragraph concludes that the comparative evidence points to the total absence of common roots present in both groups. The only exception to this is the root **tɔk / *tVk* ‘five’. Accordingly, it is concluded that it is impossible to reconstruct the Proto-Atlantic root for the numeral ‘10’ without the Niger-Congo context.

In Chapter 5, reconstructions for each family are compared. Accordingly, Chapter 5 has a different structure. If in Chapter 4 each of the sections is devoted to a particular family of languages (in particular, §4.12 is devoted to the Atlantic languages), then in Chapter 5 each section is devoted to the prospects for the

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reconstruction of each Niger-Congo numeral. So, in §5.10 all intermediate reconstructions for the numeral '10' are considered. It turns out, in particular, that the form **-taaj* reconstructed for '10' in the Proto-Bak does not find parallels in other Niger-Congo branches. In contrast, the root **pok* '10', reconstructed for the North Atlantic languages, can be related to the roots reconstructed for the vast majority of Niger-Congo families (it seems to be missing only in Ijo, Dogon and Kordofanian). Based on the NC comparison, the root for '10' is reconstructed as **pu / *fu*.

Chapter 6 traces the history of the numerals of Niger-Congo, reconstructed in Chapter 5, in each individual family of languages. Accordingly, each section, as in Chapter 4, is devoted to one of the NC families. So, §6.12 is devoted to the Atlantic languages. In particular, it is concluded that in the North Atlantic languages the term for '10' has been preserved in three sub-groups (Wolof **fukk*, Proto-Tenda **pəxw*, Proto-Jaad-Biafada **po*). In the other subgroups it is replaced with isolated innovations. The forms of the Bak languages are also innovated.

So, the basic logic of the chosen structure of the book is as follows: we will consistently move from reconstructions in individual families (Chapter 4) to the reconstruction of each Niger-Congo numeral (Chapter 5) and to the interpretation of each individual family in the Niger-Congo context (Chapter 6). We will take into account the provisions formulated in the preliminary chapters concerning noun classes in numerals (Chapter 2) and changes by analogy in systems of numerals (Chapter 3).

2 Noun classes in the Niger-Congo numeral systems

In most NC languages, the numeral stems are combined with noun class markers. More often we are dealing with the dependent markers of noun classes (in particular, in the numeral '1', as well as in the numerals '2'-'5') in those languages where there is an agreement between numerals and nouns. But class markers appear in many languages, even without any agreement. For example, when counting, numerals are often used in a nominal function and include obligatory markers of noun classes. In this case, numerals as nouns and, on the other hand, numerals as proper numerals can have different class markers (and different roots). Thus, in Likile (Bantu C) *li-γɔɔ* 'ten' (CL5), *mo-túkú* / *mi-* 'dozen' (CL3 / CL4) (Carlington 1977).

In many languages, nominal classes in numerals are easily recognized. In other languages, as a result of phonetic processes at the junction of CM and numeral stem and/or as a result of changes by analogy in the paradigm of numerals, it might be difficult to determine which noun class is included in the numeral, although we can distinguish a lexical root. Thus, in Lulamoji (Bantu J) in some derivated numerals (*mm-kágá* '60' < *mu-kágá* '6' and *mm-sáánvu* '70' < *mu-sáánvu* '7'), an obscure CM **mm-** is observed (Larry Hyman, p.c.). It is not homorganic, so we can not treat it as CL10. Meanwhile, in the majority of other languages within this group, it is clearly CL10 which is observed in these forms: cf. for example, in Gwere *ṅka: ga* '60', *ṅsanvú* '70', cf. *lù-kúmì* '1000' / *ṅkúmì*, *βìβìrì* '2000' (clearly CL11 / CL10).¹ Such cases are not sufficiently dramatic for reconstruction.

However, in a number of languages in synchrony we do not have sufficient criteria to decide whether we are dealing with the root of a numeral or with combinations of a root with an archaic noun class marker. In other words, we cannot isolate the root, and therefore we cannot compare it with the roots of other languages. E.g. we possess no formal proof that the Kobiana (Atlantic) term

¹The irregular allomorph of CL10 may have arisen as a result of a change by analogy with the basic numeral '6' and '7': N homorganic (CL10) in these derivated forms > **mm-** by analogy with **mu-** (CL3).

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sana ‘four’ is composed of *sa-* being a class prefix adduced to the lexical base (*-na*). This base is only distinguishable by means of external comparison, although this method alone is admittedly insufficient, since the Kobiana term may as well be interpreted as an innovation (*sana* ‘4’).

In more complicated cases, it should be assumed that a noun class affix replaced one of the segments of the stem, thus becoming an integral part. The Wolof (Atlantic) numerals provide a good example of this phenomenon. The following numerical terms are attested in Wolof at the synchronic level: *ñaar* ‘2’, *ñett* ‘3’, *ñeent* ‘4’. Normally the noun class affixes are not included in the lexical base in Wolof, so synchronically we do not have to interpret the first consonant of Wolof numerals as a prefix. However, there are a number of important arguments in favor of the presence of the frozen prefix * \tilde{N} - in the Wolof numerals. First, these are the only numerals that agree in the \tilde{N} class, being one of the two plural noun classes preserved in Wolof (cf. *fukk* ‘ten’ which agrees in the singular noun class B). Secondly, the forms *yaar* ‘2’ and *yett* ‘3’ (with the initial consonant being identical to the other plural noun class - Y) which agree in the Y class have been preserved in some Wolof dialects. Finally, as we hope to demonstrate below, the unification of numerals by class in Niger-Congo languages is characteristic of terms covering the sequence from ‘two’ to ‘four’. Thus, in the diachronic perspective, the consonants in question should be viewed as characteristic of class markers rather than stem segments. However, if this assumption is correct, we are forced to conclude that these markers have been integrated into the stem, having replaced the original initial consonants of the terms in question, the more so that VC-roots are uncommon in Wolof (numerical roots most probably had CVC structure, see Pozdniakov & Robert 2015: 615–616). This means that the Wolof terms are of little significance for the reconstruction of the terms for ‘2–4’ in Proto-Atlantic.

Most of the issues (theoretical ones included) that have complicated our reconstruction while studying noun classes in the families and branches of Niger-Congo pertain to the relationship of noun classes and numerals at the synchronic level. These problems are often left aside in the grammatical descriptions and do not attract sufficient attention from linguists. I am not aware of any work which discusses them systematically. Meanwhile, I am sure this question is worthy of attentive study because it reveals additional characteristics of noun class systems.

The first five numerals in Niger-Congo usually agree with nouns, for example in Sereer: *o-koor o-leng* ‘one man’, *a-koy a-leng* ‘one monkey’, *Ø-naak Ø-leng* ‘one cow’. In some languages and branches of the macro-family, the inventory of numerals that show agreement is reduced.

As noted, the noun class marker may appear in numerals in some contexts which are not related to the agreement.

1. For instance, for counting, the majority of languages include a class marker (CM); moreover, different numerals may have different affixes. For example, in Biafada for the numerals '1', '6-7' the class N is used, for '2-4' the class **bi-**, **gə** – for '5', **Ø** – for '8-9', **ba** – for '10'.

A lot of languages use CM in numerals starting from '6' and higher, that is in the numerals that do not show agreement in class, and not only in counting. For example, in Manjak *ngə-bvs ngə-təb* 'two dogs' (agreement), *ngə-bvs ɔ-ntaja* 'ten dogs' (lack of agreement, numeral '10' with CL **ɔ-** is used in an independent form).

The choice of the noun class for numerals in the two aforementioned contexts (in counting forms, and in numerals with no agreement) represent a very interesting case which I will outline hereinafter.

2. The interaction between noun classes and numerals cannot be limited to the aforementioned contexts. Noun classes emerge as well in derived numerals. The three main cases will be highlighted as follows.

Firstly, in the majority of Niger-Congo languages (and, apparently, even in Proto-Niger-Congo) the numeral '8' was formed from '4' by the reduplication of the first syllable of the original root **CL-na(h)i* '4' > **CL-na-na(h)i* '8'. Often the noun class marker of '4' and '8' coincides, but sometimes they do not. A question therefore arises: which factors define the choice of a noun class in a derived numeral?

Secondly, the Niger-Congo languages use compound numerals extensively, as do the majority of languages in the world. For example, the numeral '40' is formed following the model '40' = '4*10' (in many Bantu languages, for instance) or '40' = '20*2' (in the majority of Atlantic languages). The latter model is based on finger-counting, when two hands and two feet give a sum of 20. The numeral '20' goes back to the lexeme 'chief' or 'man'. In these languages the numeral '15' is often formed following the model 'two hands and one foot'. This model is well known and is discussed in the literature. However, the question of the choice of noun class in the first and second formative of these compound numerals was often left aside. Meanwhile, this question needs more clarification. The following questions will be discussed in the present study.

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In a compound numeral, for example, '20' = '10*2', the class marker is often absent in the second formative. For example, in Bomwali (Bantu, A80) we have: Ø-kamɔ '10' (CL9),² *be-ba* '2' (CL2), *mɔ-kamɔ Ø-ba* '20'. In this type of language, we have additional causes to discuss derivative words rather than syntagms.

In a compound numeral, both formatives include class markers, for example, '20' = 'CL-10*CL-2'. The CM can be different or the same in the two formatives: Pinji (B30) *n-dzimà dí-bàlè* '20' (10*2), Nsong (B80) *ma-kwim m-ɔ:l* '20' (10*2). In the latter case, a particular type of *agreement* can be observed, that is, the second formative agrees in class with the first formative.

If in a compound numeral both formatives include class markers, as in '20' = 'CL-10*CL-2' then theoretically we can expect that the noun class of the first formative will coincide with the class of the independent numeral '10'. This strategy is very rare. One of the unique examples comes from Moghamo (Grassfields) *i-yùm-bē* '20' (*i-yùm* '10', *i-bē* '2'). In the majority of cases the noun classes of the two formatives do not coincide. For instance, in the same branch of Benue-Congo (Grassfields): Laimbue *mí-yím-bò* '20' (*í-yím* '10', *bò* '2'), the number '10' changes its class, being part of the first formative of the numeral '20'. The interpretation of this strategy in Niger-Congo languages will be given later. The same problem arises with the second formative. Very rarely does its class coincide with the noun class of the initial numeral (in the present case we deal with the numeral '2'). In the majority of cases it differs. The cause is, as it was already mentioned above, that the second formative agrees with the first one. For example, in the same group of languages (Grassfields): Mundani *è-yem ye-be* '20' (*è-yem* '10', *be-be* '2'). In some languages, noun classes of simple and compound forms differ even if agreement is absent.

3. Finally, the strategy of forming numerals only by the change of the noun class and with no changes in the lexical root represents a real parade of paradigmatic values of noun classes in numerals. This strategy was system-

²For a reader who is not aware of the tradition of Bantu linguistics, it is necessary to explain that in Bantu languages there is a stable inventory of noun classes, each having a fixed number. The ongoing numeration of Bantu was found useful for the study of noun classes in Niger-Congo in general, where the numeration of classes of non-Bantu languages represents a concrete etymological hypothesis. If a scholar assigns the number '6' to the class **-dam** of Fula (Atlantic language), it means that etymologically it should be related to the class ***ma** (CL 6N) of Proto-Bantu.

2.1 Noun classes in the counting forms of numerals

atically developed in one zone of Bantu languages, that is zone J (although it can be encountered sporadically in some other Niger-Congo languages). For example, in Chiga (Bantu J): *i-βiri* ‘2’ > *à-βiri* ‘20’ ; *mù-kâ:gà* ‘6’ > *ŋ-kâ:gà* ‘60’, *mù-nâ:nà* ‘8’ > *ki-nâ:nà* ‘80’.

It is interesting that the same language combines all three strategies. Thus, in Chiga:

1. The numeral ‘8’ is formed by reduplication of ‘4’: *i-nà* ‘4’ > *mù-nâ:nâ* ‘8’ (and we can observe the variation of noun classes 5 (*i-*) and 3 (*mù-*);
2. The numeral ‘200’ is formed by a word-combination, but not by the combination of ‘100’ and ‘2’ as we would expect. Instead, it is formed by the combination of ‘10’ and ‘2’: *βi-kùmì βi-βiri* ‘200’ (*i-kùmì* ‘10’, *i-βiri* ‘2’). Thus, ‘200’ (CL.PL) is a plural form of ‘10’ and ‘2’ (CL.SG). Furthermore, the second formative agrees in noun class with the first.
3. The numeral ‘20’ is formed from ‘10’ by changing the noun class exclusively: *à-βiri* ‘20’ (*i-βiri* ‘2’), and by the use of a different noun class, different from the one we find in ‘200’, that is CL.PL *à-*.

2.1 Noun classes in the counting forms of numerals

In some Niger-Congo languages, numerals do not have noun class markers in the counting form, but the number of these languages is very low. In the Atlantic family the only language with this feature is Balant. In the majority of Niger-Congo languages while naming a numeral (for example, in counting) noun class markers are used. These markers may be the same for all numerals, but this is a rare case. More often, for the numerals 1–10 there are three to four different markers (furthermore, special class markers may be used for the numerals ‘20’, ‘100’, ‘200’ and others).

A fragment of the Tetela (C80) numeral system is presented below (Table 2.1).

We see here a variety of classes as well as plenty of mini-clusters (note the noun class switch that occurs when a number becomes a part of a compound term; this phenomenon is characteristic of the Niger-Congo languages). The terms for ‘one’ (*ó-* class), ‘hundred’ (*lo-*) and ‘thousand’ (*ki-*) appear to be isolated on account of their noun class. At the same time, the following groups of terms are distinguishable: ‘2–3’ (*ha-*), ‘4–6/20’ (*a-*, «/» refers to the grouping of non-adjacent numerals), ‘7–8’ (*e-*), and ‘9–10’ (*di-*). It should be noted, however, that

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Table 2.1: Tetela numerals

1	ó-tɔy	9	di-vwá
2	ha-énde	10	dí-kumi
3	ha-sátu	20	á-kumi á-ende
4	a-néy	90	á-kumi di-vwá
5	a-tánu	100	lo-kámá
6	a-samále	200	n-kámá y-éndé
7	e-sambéélé	1000	ki-nùnu (yínja)
8	e-náánéyi	2000	ø-nunu p-énde

even in such systems some numerals can be used without noun class markers ('2000').

Three issues need to be mentioned here.

The noun class markers are easily distinguishable in Tetela. However, for the majority of the NC languages (especially the non-Bantu ones) this is not the case. The criteria that would allow for distinguishing between the markers and the segments of stems are often lacking, which means that we have no idea which stem in a language under study is to be used for comparative purposes. The situation is even more grave in those numerous cases where an additional class marker is added to a numeral which contains an archaic class marker integrated in a stem.

The mechanism underlying the grouping of numerals into the mini-clusters (by including them in a common noun class) remains virtually unexplored, although it is certainly worthy of investigation and thorough consideration from the theoretical point of view. What was the motivation behind the use of the class marker *ha-* with the Tetela terms for 'two' and 'three', while in case of 'nine' and 'ten' the class marker *di-* was preferred in this language? The answer to this question is probably not to be sought within the semantics of a given noun class. On closer examination, the choice of a noun class in such distributions is often unmotivated by anything other than the need to formally distinguish a group of numerals (as opposed to other groups). In this respect, this mechanism is very similar to the alignment by analogy as applied to numerals in many languages. This strategy (implying an irregular alteration of a part of a lexical stem) can be compared to a radical surgery, which is never an easy option. Languages with noun classes have less traumatic means to achieve the same result, e.g. by using different noun class markers to distinguish between the groups of numerals. This elaborate marking technique is widely attested in the Niger-Congo lan-

guages. The grouping of numerals is typologically interesting as well: some of the groups are fairly common whereas some are quite rare. Moreover, it is probable that these groups were formed independently in different languages: a situation where a pair of closely related languages exhibit radically different grouping and vice versa is not uncommon.

Some numerals are not normally subject to grouping and tend to be marked with a specific noun class, thus standing in opposition to the rest of the numerical terms. The use of this specific class is especially frequent with the terms for ‘one’, ‘hundred’ and ‘thousand’, cf. e.g. specific noun classes observable in the Tetela terms for ‘one’ (ó-) and ‘hundred’ (lo-).

Let’s look at the distribution of numerals in noun classes for the languages where this information is available. This observation will be made on a selection of 254 Benue-Congo languages (among these, 166 are Bantu languages, evenly distributed by zones). Our sampling comprises languages that are known to employ noun classes on the numerical terms used in counting.

2.1.1 **The specific marking of numerals**

As mentioned above, specific noun classes are used with the terms for ‘one’ and ‘ten’ especially often: 174 languages out of 254 mark the numeral ‘1’ in a distinguished way, and 151 languages mark the numeral ‘10’ separately.

Examples of systems with the term for ‘one’ being in opposition to the rest of the numerals (marked with a different noun class)³ are provided below (Table 2.2).

Examples of one other strategy (the term for ‘ten’ being a noun remains in opposition to the rest of the numerals by means of a noun class) are given in Table 2.3.

Another strategy with the terms covering the sequence from ‘two’ to ‘nine’ being opposed to the terms for ‘one’ and ‘ten’ is characteristic of the languages represented in Table 2.4.

However, the terms for ‘one’ and ‘ten’ can form a group opposed (by means of a noun class) to the rest of the numerals (Table 2.5).

With the exception of the terms for ‘one’ and ‘ten’, a specific marking of numerals by means of a noun class is rarely attested. A specific noun class (different from noun classes in other numerals) was found in only 6 languages for the numeral ‘3’, and in only 7 for the numeral ‘4’. It should be noted, however, that a specific marker is often employed for the terms within the sequence from ‘six’

³Considering the fact that numerals ‘2–9’ belong to the same noun class, the numerals ‘6–9’ are not included in Tables 2.2–2.5.

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Table 2.2: Specific noun classes in ‘1’

Branch	Language	‘1’	‘2’	‘3’	‘4’	‘5’	‘10’
J30	Nyole	ndala	ebiri	edatu	ené	etaanu	ehúmi njereere
Defoid	Ede Ica	ɔkɔ̃	eji	eta	ēē	ɛwu	ɛya
Defoid	Ede (dial.)	ɔkē	méḏḏì	méeta	méhē	méhú	méwá
Defoid	Ifè	ènɛ / ɔkɔ̃	méédzi	méeta	méerē	méerú	maá
Mbe	Mbe	ómè	bép ^w ál	bésá	béñí	bétjān	béf ^w ōr
Mbam	Nomaande	ɔmɔté	béfendi	batátó	bényise	batáánó	bóóháta
Mbam	Tuotomb	ómò	péfá ⁿ d	pédààt	pínis	pétàn	p ^w ówàt
Mbam	Tuki	umwē:síí	mówá	mótátó	mwé:né	motá:nó	mwábótó
Mbam	Yambeta	ímù?	móbààn	módáád	múni?	mótáàn	mówád
Mbam	Nubaca	pòmóhò	m ^w ántjɪ	mùtát	mùñihì	mùtā:n	m ^w ap ^w at
Mbam	Yangben	pùmòm	mándè	matát	méni	mát ^h án	mát ^h
Mbam	Numaala	bùm^wòm	mā:ndè	mádáḏḏ	méni	mát ^h án	mát ^h
Mamfe	Denya	gémá	ópéá	ólé	óni	ótà	ófiá

Table 2.3: Specific noun classes in ‘10’

Branch	Language	‘1’	‘2’	‘3’	‘4’	‘5’	10
S30	Kgalagadi	(bɔ):ɲwɪ	(bɔ)birí	(bɔ)rá:rɔ	(bɔ):nɛ	(bɔ)t ^h á:nɔ	lɪfó:mɪ
S10	Kalanga	(kù)ɲómpɛlá	(kù)bílí	(kù)tátú	(kù)nná	(kù)ʃánù	gùmí
Cross-River	Bete-Bendi	ikèn	ifè	ikíé	inè	idíóɲ	lèh^wó
Mbam	Nugunu	gímmue	gáandɛ	gádado	génni	gátáano	séodo
Idomoid	Eloyi	ńgwònzé	ńgwòpó	ńgwòlá	ńgwòndó	ńgwóló	úwó
Jukunoid	Akum	ájì	afá	ata	ajì	acóɲ	ikùr(ù)
Platoid	Tyap (Kataf)	anyuj	afeaj	atat	anaai	afwuon	swak

to ‘nine’, e.g. the term for ‘nine’ bears a specific noun class marker in the 151 languages under study.

2.1.2 The grouping of numerals by noun class

Adjacent numerals are more often grouped by their noun classes. Among different numeral grouping types, several are diffused across all main branches of Benue-Congo. I will list 15 of the more frequent groupings of numerals and illustrate each of them with an example. These groupings are reported in Table 2.6.

Even limiting Table 2.6 to 15 groupings demonstrates the fact that some numerals (for example, ‘2’) are grouped by noun class more often than other numerals (for example, ‘8’). By analyzing the whole table of groupings (reported in Appendix A-B), the following observations can be made regarding each numeral.

2.1 Noun classes in the counting forms of numerals

Table 2.4: Common noun classes for ‘2’-‘9’

Branch	Language	‘1’	‘2’	‘3’	‘4’	‘5’	‘10’
Cross-River	Ebughu	sɪŋ	ibà	ité	iniàŋ	itɪŋ	lùgò
Cross-River	Oro	ki	ibà	ité	iniàŋ	itɪŋ	lughu
Cross-River	Usakade	tʃɛn	m̀bà	ntá	nniòŋ	ntʃón	nùòp
Cross-River	Leggbo	ẁoni	áfɔŋ	àttan	ànnanɔ	àzen	dzɔ
Platoid	Ayu	ɪdɪ	afah	ataar	anaŋaf	atugen	ifog
Grassfields	Mundani	yea-mɔʔ	bebe	betat	bekpi	betãã	èyem
Igboïd	Ekpeye	ɲiné	ɓ̀ibó	ɓ̀ító	ɓ̀inó	ɓ̀ísè	ɗ̀i
Tivoid	Ipulo	émò	viál	vétát	véɲi	vétàn	épó:t
Isimbi	Isimbi	kēnə	m̄əràkp̄ə	m̄àkəl̄ə	m̄ōɲi	m̄àtən̄ə	b̄uyù
A40	Bankon	(i)yá	(bi)ɓ́á	(bi)iyá	(bi)nàn	(bi)tán	ibòm
A80	Bekwil	wát / ɲgót	e-ɓ́á	e-lél	e-nà	e-tèn	kám
A80	Koonzime	gwár	bibá	bilél	biná	bitèn	kám
B20	Kélé	nwúntù	bàbá	bàlál(è)	bànáyi	bátán	dyúm(ù)
B20	Ntumbede	íwótó	ɓ̀óbà	ɓ̀órárè	ɓ̀ónáyè	ɓ̀ótánè	ɗ̀zómè
J20	Jita	kam ^w i	βiβiri	βisatu	βina	βitanu	ekumi
K20	Mbunda	cimo	vivali	vitatu	viwana	vitanu	likumi
M20	Ndali	kamukene	fi-w̄iri	fi-tatɔ	fi-na	fi-hano	kalo ^g o
N30	Nyanja	cimódzi	(zi)βiri	(zi)tátu	(zi)nái	(zi)sanu	k ^h úmi
N20	Tumbuka	ka-môza	tu-w̄iri	tu-tátu	tu-nâyi	tu-nk ^h onde	k ^h úmi
P20	Makonde	íimo	mbiili	nnaátu	nŋe:ŋe	mwaánu	likuúmi / kuúmi

Table 2.5: Common noun classes for ‘1’ and ‘10’

Branch	Language	‘1’	‘2’	‘3’	‘4’	‘5’	‘10’
Platoid	Ayu	ɪ-dɪ	a-fah	a-taar	a-naŋaf	a-tugen	i-fog
Tivoid	Ipulo	é-mò	v-iál	vé-tát	vé-ɲi	vé-tàn	é-pó:t
Bantu-A40	Bankon	(i)yá	(bi)ɓ́á	(bi)iyá	(bi)nàn	(bi)tán	i-ɓ̀óm
Bantu-M20	Ndali	ka-mukene	fi-w̄iri	fi-tatɔ	fi-na	fi-hano	ka-lo ^g o

Numeral ‘1’. Groupings of the numeral ‘1’ are relatively rare: the majority of languages, obviously, prefer to oppose ‘1’ to all other numerals. In case it is grouped with other numerals, the most frequent grouping is within the first five (‘1–5’) or six (‘1–6’) numerals. In the analyzed database there are four languages which differentiate the first two numerals ‘1–2’. For instance, Ngoreme (Bantu-E10): *e-m^we* ‘1’, *e-bere* ‘2’, but *i-satɔ* ‘3’, in Gitonga (S60) *mwéyo* ‘1’, *mbili* ‘2’, but *dzi-ná* ‘4’.

Numeral ‘2’. The numeral ‘2’ reveals the maximum predisposition to groupings. The most frequent are: ‘2–5’ and ‘2–6’. The grouping ‘2–4’ is significantly less

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frequent but remains present in the majority of Bantu zones and in other groups of Benue-Congo languages.

Numeral '3'. '3' is often found in groupings but is very rarely opposed by noun class to '2'. However, some very interesting examples exist. For example, Mbuun (Bantu-B80): *umwés* '1', *byěl* '2', *í-tár* '3', *í-na* '4', *í-tân* '5'. It is worth mentioning that grouping of '3-8' and '3-10' were not encountered in any of the languages examined.

Numerals '4' and '5'. The only frequent grouping involving '4' is '2-4' (except groupings that include four numerals or more) and for '5' it is '2-5' or '2-5/10'. The grouping '5-9' was encountered only in five languages and the grouping '5-10' and '5-8' (in combination '5-8/10' – only in one language. The lack of a frequent grouping of '5-9' can seem even more strange because in many languages numerals '6-9' are based on 5 (moreover, this type of derivational model can be reconstructed for Proto-Bantu and, perhaps, for Proto-Benue-Congo, with the sole exception of the numeral '8' which was apparently formed from '4'). Another unexpected case is the lack of grouping for '5/10', that is the lack of a specific class for '5' and '10', considering the fact that in many languages '10' is formed from '5'. This model was encountered only in one dialect of Eggon: *ò-tnó* '5', and *ó-kpo* '10', while in other numerals the noun class is not marked (I am not aware whether the different tone on the prefix indicates a different noun class).

Numeral '6'. A high number of groupings of '6-9' is natural. In many languages it becomes '6-8' because of the specific derivation of the number '9'. In contrast, groupings '6-10' are very rare.

Numeral '7'. It is worth mentioning the frequent grouping of '7-8' (21 languages). We are dealing not with one concrete class in Benue-Congo but rather a similar way of marking the numerals '7' and '8'. In the three examples reported in Table 2.3 the presumably common CL7 (Cilungu *tji-*, Sakata *ke-*, Xhosa *si-*) was found, in other languages a number of different classes can be encountered (Table 2.7).

Numerals '8', '9', '10'. The same characteristic is typical for the frequent groupings of '8-9' and '9-10', shown in Tables 2.8-2.9.

2.1 Noun classes in the counting forms of numerals

Table 2.6: The most frequent groupings of numerals based on noun classes in Benue-Congo languages

Grouping #	Entire grouping	BC branch	Language	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'10'
2-5	1, 2-5, 6, 7-8, 9, 10	Bantu-F10	Cilungu	ífoónjá	ví-íli	ví-táti	ví-ní	ví-sáanò	mù-tàandá	fí-fí-nímbálí	fí-fí-naáni	fíúndfimbálí	i-kími
2-6	1, 2-6, 7-8, 9, 10	Bantu-C40	Sakata	némo	i-pé	i-sar	i-ní	i-tsir	i-sonj	ke-fo	ké-né	leva	jò
2-4	1, 2-4, 5, 6, 7, 8, 9, 10	Bantu-C50	Pagibete	moti	e-bale	e-salo	e-kwanpane	bumoti	motoba	sambo	mwambe	libwa	zomi
2-9	1, 2-9, 10	Grassfields	Mundani	yea-mo?	be-be	be-tat	be-kpi	be-táá	be-ntua	be-sáámbe	be-fáá	be-bá?a	é-ým
7-8	1, 2-6, 7-8, 9-10	Bantu-S40	Xhosa	jà	m-bini	n-táthù	*n-né ?	n-tlànù	n-tándat'hù	si-ll'ngjè	si-bázó	li- ^h báá	lí-fúmi
6-9	1-5, 6-9, 10	Ekoid	Nde-Ndele	n-dji	m-ba	n-sa	n-né	n-db-n	a-sighasa	a-simma	a-neghane	a-sima-wobo	wobo
9-10	1, 2-5, 6, 7, 8, 9-10	Platoid	Lijili	lò	à-bé	à-tfè	a-narò	à-sò	mì-nzí	mù-tá	rùnò	zá-tfè	zá-bè
1-6	1-6, 7-8, 9, 10	Bantu-E10	Simbiti	ka-m'e	ka-feré	ka-tato	ka-mné	ka-taano	ka-sa'saifa	mu-hu'gate	mò-naane	ke'da	i-komi
6-8	1-5, 6-8, 9-10	Bantu-F30	Nilamba	ka-mwe	ka-beli	ka-tatu	ka-nee	ka-láno	mu-tandatu	mup-ungate	mu-naana	kyenda	kyumi
2-10	1, 2-10	Mbe	Mbe	ómè	bé-p'wál	bé-sá	bé-ní	bé-tfán	bé-sésár	bé-tánep'w'ál	bé-níbh'ni	bé-tánebéni	bé-fwór
1-5	1-5, 6, 7, 8, 9, 10	Grassfields	Ghomala	yó-mú?	yó-pwó	yó-tá	yá-pfúò	yó-tó	ntókó	sambwáó	hóm	vù'tú	yám
8-9	1/7, 2-6, 8-9, 10	Bantu-H30	Ngongo	m-wisi	b-wol	bé-tat	be-wan	bé-tan	be-saman	ns-ambwadi	ke-nan	ke-bva	é-kwom
1-10	9	Defoid	Ayere	ì-ká	ì-dji	ì-tá	ì-jè	ì-tú	ì-fá	ì-dj'í	ì-rò	ì-dá	ì-g'wá
7-9	9	Idomoid	Alago	ó-je	è-pà	è-ta	è-nè	è-ho	ì-hiri	à-hapà	à-hatá	à-hánè	ì-g'wó
2-3	9	Cross-River	Elemé	ñ-né	ò-beré	ò-taa	è-taale	è-wò	è-?òrò	à-?arabà	à-?aataa	è-sira?ò	à-?ò

The first column contains a stable grouping of numerals illustrated by an example. The second column indicates the number of languages which have this grouping (out of 254 languages under consideration). The rows in the table are organized in decreasing order. The third column lists all the groupings based on the noun class for a concrete language. Groupings of the adjacent numerals are indicated by a hyphen. Groupings of non adjacent numerals are indicated by a slash. Thus, the formula in the third column of the last row can be interpreted as follows: in Elemé there are three groupings of numerals – '2-3' (class ò-), '4-6' and '9' (class è-), and also '7-8' and '10' (class à-).

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Table 2.7: Groupings of ‘7’-‘8’ by noun classes

Branch	Language	‘6’	‘7’	‘8’	‘9’
Bantu-B70	Teke-Tyee	bísémene	n-tsaama	m-pwómɔ	Owá
Bantu-C80	Tetela	asamále	e-sambéélé	e-náánéyi	Divwá
Bantu-J30	Nyore	bisasaba	mu-safu	mu-nane	Sienda
Platoid	Yeskwa	èncí	tò-nvà	tó-ndát	tyúôrá
Cross-River	Eleme	èʔòrò	à-ʔàràbà	à-ʔaataa	èsiraʔò

Table 2.8: Groupings of ‘8’-‘9’ by noun classes

Branch	Language	‘7’	‘8’	‘9’	‘10’
Bantu-B10	Myene	ò-rwáyénò	è-nánáyì	è-nóyòmì	ì-yómí
Bantu-B20	Sake	bì-tánènèbibá	rì-mwâmbì	rì-bvùwó	dzúmù
Bantu-B80	Mpiin	n-sámwê:n	bí-nán	bí-vwa	kub
Bantu-H10	Kikongo	sàmbúwàlì	í-nànà	í-vùwà	kúmì
Bantu-B80	Songo	n-sambwar	ki-nan	ki-va	kwim
Bantu-J40	Nande	eri-rínda	omú-nani	omw-énda	erí-kúmi
Bantu-J50	Tembo	βi-rínda	mú-nane	mw-enda	é-kumi
Grassfields	Ngomba	sambá	yé-né-fom	ye-ne-pfúʔú	ne-gám

Table 2.9: Groupings of ‘9’-‘10’ by noun classes

Branch	Language	‘8’	‘9’	‘10’
Bantu-B70	Teke-Tyee	m-pwómɔ	o-wá	o-kwúúmu
Bantu -C40	Budza	mo-nánáye	li-bwá	ly-ómo
Bantu -C80	Tetela	e-náánéyi	di-vwá	dí-kumi
Bantu -G60	Hehe	m-nane	nyi-gonza	nyi-chumi
Bantu -J60	Rundi	umu-naáni	i-tféenda	i-tfúmi
Platoid	Lijili	rúnó	zà-tfẹ	zà-bẹ

2.2 Noun classes in derived (reduplicated) numerals

Reduplication is widely attested as a means of constructing numerical compounds in NC. This is especially applicable to the pattern ‘8 = 4 redupl.’ which, as we hope to demonstrate below, can be reconstructed at the Proto-Niger-Congo level. Another common pattern (attested, however, with a somewhat lesser degree of frequency) is ‘6 = 3 redupl.’. Three main strategies pertaining to the use of the noun classes are employed within this derivation scenario:

1. Reduplicated terms preserve the class marker of the source-term in both segments, cf. e.g. Ndoe (Ekoid) *be-ra* ‘3’ > *be-ra-ba-ra* ‘6’, *be-ne* ‘4’ > *be-ne-be-ne* ‘8’; in Alege (Cross-River) *é-cɛ* ‘3’ > *é-ce-e-ce* ‘6’.
2. The original class marker is preserved in only the first segment of the reduplicated form, and omitted in the second: Okpamheri (Edoid) *e-sa* ‘3’ > *e-sa-Ø-sa* ‘6’, *e-ni* ‘4’ > *e-ni-Ø-ni* ‘8’.
3. Finally, the class marker of the first segment of the reduplicated form is different from that of its source-form: Kwa (Ekoid) *e-sa* ‘3’ > *a-sa-ka-su* ‘6’, *i-ni* ‘4’ > *a-ni-ka-ni* ‘8’.

The number of these strategies is reduced to two in cases where a derived term is non-separable (e.g. derived by partial reduplication). In such cases, the class marker of the source-term can be either employed (Kikuyu *i-tatu* ‘3’ > *i-tatatu* ‘6’), or not (Vinza *ka-ne* ‘4’ > *mu-nane* ‘8’).

We might expect that while forming ‘8’ from ‘4’, the singular class of the latter would be switched to the plural class of the former. In Bantu languages, however, this is not the case. Apparently already in Proto-Bantu we should reconstruct the derivational model **i-nàì* ‘4’ (CL.SG.5) > **mò-nànài* ‘8’ (CL.SG.3). However, from an etymological point of view, the class **mu-** represents the reflex of the class 6B.PL and not a reflex of the class 3.SG in Niger-Congo. This question raises an additional and very important topic which cannot be examined in the present study (the arguments in favor of class 6B.PL **mu** in Proto-Niger-Congo can be found in Pozdniakov 2013).

Bantu languages. The following presents partial data on the numeral system in Myene (B10)⁴ (Table 2.10).

First of all, it is interesting to highlight a variety of noun classes in the left column of the table and their uniformity in the right one. In the numerals from

⁴Thanks to Odette Ambouroué for some clarifications and for a profiatable discussion on noun classes in Myene.

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Table 2.10: Myene numerals

1	*N-mòrì (> mòrì)		
2	*N-bàni (> mbàni)	20	à-γóm á-mbàni (10*2)
3	*N-rárò (> tǎrò)	30	à-γóm á-rárò
4	*N-náyì (> náyì)	40	à-γóm á-náyì
5	ò-tání	50	à-γóm á-tání
6	ò-rówá	60	à-γóm ó-rówá
7	ò-rwá-γé-nómò (6+1)	70	à-γóm ó-rwá-γénô
8	è-ná-náyì (2*4)	80	à-γóm é-ná-náyì
9	è-nó-γòmì (10-1)	90	à-γóm é-nó-γòmì
10	ì-γómí	100	*N-kámá.
		200	kámá mbáni

1 to 10, the system includes four different singular noun classes: N- (CL9) – ‘1-4’, ò- (CL3) – ‘5-7’ (the numeral ‘7’ is formed as ‘6+1’, where *nómò* means «the only one, the same»), è- (CL7) – ‘8-9’ (the numeral ‘8’ is a reduplicated form of ‘4’, the numeral ‘9’ is formed as ‘9 = 10 - 1’) and finally, ì- (CL5) – ‘10’. A homorganic nasal can be quite reliably reconstructed in ‘1-4’, sometimes appealing to indirect characteristics. For example, in *tǎrò* ‘3’ the nasal is absent but in Myene **tj-** is not a reflex of *t. In this language *t- > r-, as can also be seen in the second formative of ‘30’. The initial **tj-** can be traced back to *N-r-.

In numerals of dozens only CL6 à- is used, which is one of the plural classes (with a collective meaning). An interesting detail: in ‘20’ – ‘50’ the second formative agrees with the first one in noun class (á-), and in ‘60’ – ‘90’ there is no agreement (the second formative maintains noun classes which mark the units as in independent forms; its high tone is due to the high tone in the preceding root *γóm*).

Non-derived numeral ‘100’ belongs, as ‘1’, to the singular class CL9. Does the second formative of ‘200’ agree with the first one? It is impossible to say, because the noun classes of both formatives coincide when used singularly.

Finally, it is possible to formulate the principle of derivation with reference to the noun classes: the numeral ‘10’, being a formative of numerals ‘20’ – ‘90’, maintains its meaning but changes the singular noun class to a plural noun class following the most standard SG ~ PL correlation in the language. For CL.SG.5 (ì- in Myene) which is expressed through *ì-γómí* ‘10’, the standard correlate is CL.PL.6 (à-). Concerning the second correlate (units), it agrees with the first one (dozens)

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in the numerals that even in independent use show agreement with nouns (in Bantu numerals ‘1–5’ show agreement with nouns). For this reason in numerals ‘20’–‘50’ units from ‘2’ to ‘5’ agree with ‘10’ in its plural form and in ‘60’–‘90’ second formatives ‘6’–‘9’ do not show agreement.

If we confront the numeric characteristics of simple and derived forms, the formation of numerals in Myene can be represented by SG > PL-PL and numerals ‘60’ – ‘90’ by SG > PL-SG.

This system is quite typical for Bantu languages, although the variation is considerable. The main variations are illustrated in Table 2.11, including languages only from the zone J.

Table 2.11: Number patterns in derived numerals

SG > SG-PL	10 > 200	CL5 > 5–8	Hema	10	ikumi	200	ikumi bibiri
SG > SG-PL	1000 > 2000	CL11 > 11–8	Hema	1000	rukumi	2000	rukumi bibiri
SG > PL-PL	2 > 20	CL5 > 6–6	Gundu	3	isátó	30	makumi gasató
SG > PL-PL	100 > 200	CL5 > 6–6	Shi	100	igana	200	magána abiri
SG > PL-PL	10 > 200	CL5 > 8–8	Chiga	10	ikúmi	200	βikúmi βíβiri
SG > PL-PL	100 > 200	CL7 > 8–8	Ganda	100	tjikúmi	200	bikúmi bibiri
SG > PL-PL	1000 > 2000	CL7 > 8–8	Shi	1000	cihumbi	2000	bihumbí bibiri
SG > PL-PL	1000 > 2000	CL11 > 10–8	Ganda	1000	lúkúmi	2000	ɲkúmi bíbiri
SG > PL-SG	8 > 80	CL3 > 6–3	Shi	8	múnaani	80	mákumi galí múnaani
SG > PL-SG	9 > 90	CL3 > 6–3	Shi	9	múénda	90	mákumi galí múénda
SG > PL-SG	1000 > 2000	CL11 > 10–5	Soga	1000	lúkúmi	2000	ɲkúmi íβiri
PL > PL-PL	2 > 20	CL8 > 6–6	Shi	2	bibiri	20	mákumi abiri
PL > PL-PL	3 > 30	CL8 > 6–6	Shi	3	bifarhu	30	mákumi afarhu
PL > PL-PL	4 > 40	CL8 > 6–6	Shi	4	bíni	40	mákumi ani
PL > PL-PL	5 > 50	CL8 > 6–6	Shi	5	birhaanu	50	mákumi arhaanu

The Hema example demonstrates that the pluralization of the class for the formation of derived numerals is not mandatory (at least, for hundreds and thousands), although it unconditionally dominates in the languages of this group (Shi, Chiga, Ganda, Soga). If the simple numeral is already marked for plural class (there are examples demonstrating this), the first formative of the derived numeral appears with a new plural class (for example, in Shi). In the combination SG > PL-PL the plural classes in a composed derived numeral can be different (Ganda, derivation ‘1000’ > ‘2000’).

While forming a word combination from one word, the number of possible combinations of singular and plural classes amounts to eight. As shown in the table, only four of these combinations are actually encountered. No languages show combinations SG > SG-SG, PL > SG-SG, PL > SG-PL, PL > PL-SG. This distri-

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bution demonstrates how pluralization is used for the formation of numerals of higher rank. This strategy can be systematically found in other branches of Niger-Congo.

Atlantic languages. In order to be able to compare the principles of derivation of numerals in Bantu and in Atlantic languages systematically, we need to first formulate at least three main differences between these systems.

First of all, it is important to highlight that the system of Bantu is decimal, which is not typical for other branches of Niger-Congo, nor for other branches of Benue-Congo. The overwhelming majority of Atlantic languages are ‘20’-based and not decimal. In these languages, accordingly, ‘40 = 20*2’ (and often ‘100 = 20*5’) and very rarely ‘40 = 10*4’.

Secondly, in Atlantic languages the numerals ‘6–9’ are systematically formed following the model ‘5’ + ‘1, 2, 3, 4’. This model does not permit the change of noun classes for the numerals ‘6–7’ and/or ‘7–9’. The numerals ‘6–9’ maintain all the characteristics of ‘5’ (first formative) and ‘1–4’ (second formative).

Thirdly, contrary to Bantu, the majority of forms of ‘5’ are formed from the lexeme ‘hand’, maintaining the noun class of this lexeme. In Proto-Bantu ‘hand’ and ‘five’ are reconstructed as different roots.

The sum of the abovementioned factors explains the fact that noun classes in the numerals ‘6–9’ are of no concern to the present study. Nonetheless, as will be further demonstrated, the main principle of interaction between noun classes and numbers in the numeral system of Atlantic languages is similar to that of Bantu.

Apparently, derived numerals were already formed following the model ‘40 = 20*2’, ‘60 = 20*3’, ‘80 = 20*4’ in Proto-Atlantic. Different strategies of agreement are partially shown in the table (Table 2.12, (only the most simple cases were reported)).

Table 2.12: Atlantic languages: noun classes in the derived numerals

	‘20’	CL	‘40’	CL-CL	‘2’	CL
Bijogo	o-joko (‘person’)	SG	ya-joko ya-n-som	PL-PL	n-som	PL
Banjai	‘ə-v:i (‘chief’)	SG	‘u-v:i yu:- βe	PL-PL	‘su:-βe	PL
Kasa	ə-yi: (‘chief’)	SG	ku-yi: ku-ʃuβə	PL-PL	‘si-ʃuβə	PL
Bayot (Sénégal)	‘ə-yi (‘chief’)	SG	‘ku-yi kɔ-ɪɪg:ə	PL-PL	‘ɪɪg:ə	PL
Bayot (Guinea Bissau)	ga-bamɔgɔl (‘person’)	SG	gɔ-mɔgɔl-gɔ-ɪɪg-ga	PL-PL	tɪg-ga	
Kwaatay	butuman	SG	ba-k-an ba-ka-suba	PL-PL	ku-suba	PL
Nyun Gunyamolo	buruhur	SG	ʃamaŋ ɪ-nakk	PL-PL	ha-nakk	PL
Karon	ə-wi	SG	ə-wi e-supək	SG-SG	su-supək	PL

2.2 Noun classes in derived (reduplicated) numerals

As demonstrated in Table 2.12, the majority of Atlantic languages within the Bak branch (Bijogo, Banjal, Kasa, Bayot) show that in the numeral ‘40’ (‘60’, ‘80’) the units ‘2’ (‘3’, ‘4’) agree in general according to a plural class and not according to the class of the numeral ‘20’. The same principle is characteristic for the languages of Benue-Congo. In all four abovementioned languages, the formation of ‘40’ is based on the agreement in number as for animated nouns CL1.SG – CL2.PL (this is very clear especially knowing the etymology of the numeral ‘20’).

Pluralization as a form of derivation is used when the form of the numeral ‘20’ is not transparent (Kwaatay *butuman* ‘20’, unclear etymology, Nyun Gunyamolo *buruhur* ‘20’ (possibly from «price + man»); in the numeral ‘40’ lexemes are used with the meaning ‘people’). In some languages (Karon) the agreement is based on the singular class of the numeral ‘20’ and not on its plural correlate.

In Atlantic languages that, like Bantu, systematically follow the decimal system, the pluralization of the class permits the formation of new numerals (more often as word combinations) (Table 2.13).

Table 2.13: Agreement in numerals derived from ‘10’

	SG ‘10’	PL ‘40’	SG, PL ‘4’
Basari	ε-pəxw	ɔ-fəxw ɔ-nɛx	βə-nɛx
Sua	Ø-tɛŋi	i-tɛŋi i-naŋ	b-nan

In such cases agreement of the formatives can be observed, that is the same noun class is used for dozens and units. In the languages where ‘20’ is formed from ‘10’ (10*2), the units more often do not show agreement:

- Mankanya *i-ŋɛn* ‘10’ (literally: «hands»), *i-ŋɛŋ ɲí-tɛp* ‘20’ (*ɲí-tɛp* ‘2’), *i-ŋɛŋ ɲi-bakir* ‘40’ (*ɲi-bakir* ‘4’);
- Jaad *pa-ppo* ‘10’, *pa-ppo ma-ae* ‘20’ (*ma-ae* ‘2’), *pa-ppo ma-nne* ‘40’ (*ma-nne* ‘4’),
- Palor *dɛ:ŋkeh* ‘10’, *dɛ:ŋkeh kɛ-nɛk* ‘20’ (*kɛ-nɛk* ‘2’), *dɛ:ŋkeh ni:kis* ‘40’ (*ni:kis* ‘4’).

Even in the following case the use of a plural class for units is possible: Baga Fore *ε-tɛɛ* ‘10’, *ε-tɛɛ mɛn-di* ‘20’ (*fi-di* ‘2’), *ε-tɛɛ mɛ-nɛŋ* ‘40’ (*fi-nɛŋ* ‘4’).

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Finally, in order to complete the description, hybrid composed forms will be reported, that is when ‘40’ can be traced the root ‘20’ and not ‘10’ but in units where ‘4’ is used and not ‘2’. This means that in ‘20’ – ‘90’ the root ‘10’ is used, which is different from the main root:

- Nalu *te br-le* ‘10’ (literally: «two hands», *br-le* ‘2’), *alafan bi-le* ‘20’, *alafan bi-na:ŋ* ‘40’ (*bi-na:ŋ* ‘4’);
- Pepel *o-disepene* ‘10’, *ŋ-taim pugus* ‘20’ (*ŋ-pugus* ‘2’), *ŋ-taim ŋ-uakr* ‘40’ (*ŋ-uakr* ‘4’);
- Limba *kɔɔ-hi* ‘10’, *kɔ-nt^hɔ ka-aye* ‘20’ (*ka-aye* ‘2’), *kɔ-nt^hɔ ka-naŋ* ‘40’ (*ka-naŋ* ‘4’).

In spite of plurality of strategies, the modern systems of agreement of units in the dozens reflect a significant distinction that is characteristic of the two main branches of Atlantic languages – Northern and Bak. Apparently, the proto-languages of the Bak group maintained the principle of agreement which was typical for Proto-Niger-Congo, that is, the agreement of units following the plural correlate of ‘10’ or ‘20’. This principle was lost in the system of the Northern branch, where it can be encountered in only one of the Tenda languages, Basari. It is also present in Nyun Gunyamolo, but in this language, as it is highlighted by different scholars, the numeral ‘20’ (and probably the whole agreement model) is borrowed from Joola (Bak).

The model of agreement in ‘200’/ ‘2000’ works in a similar way, as shown in Table 2.14.

Table 2.14: Agreement in ‘200’ and ‘2000’

Language	‘100’	‘200’	‘1000’	‘2000’	‘2’
1 Balant	game	g-geme g-sibi	wili mbooda (‘1’)	g-wili g-sibi	-sibi
2 Bayot	ε-temel	ɪ-temel i-rig’ga	ε-ɔli	ɪ-ɔli-i-rig’ga	tɪg’ga
3 Banjäl	ε’-keme	sɪ’-keme ‘su:-βe	‘e-uli	‘s-u:li ‘su:-βe	‘su:-βe
4 Kwaatay	temer	si-temer sú-suba	ē-ŋjune	sú-ŋjune sú-suba	kú-suba
5 Baga Fore	bɔ ben (‘1’)	fu-bɔ fi-di	tengbeŋ ben (‘1’)	fi-tengbeŋ fi-di	fi-di
6 Nalu	m-laak	a-laak bi-le	m-ŋaak	a-ŋaak bi-le	bi-le
7 Basari	keme	ɔ-keme ɔ-ki	wəli	ɔ-wəli ɔ-ki	βə-ki
8 Konyagi	keme	wə-keme wə-ki	wəli	wə-wəli wə-hi	wə-hi

As observed for dozens, the agreement in ‘200’ and ‘2000’ can be systematically observed only in the languages of the Bak group (languages 1–5 in Table 2.14). In the Northern group this agreement is found only in Basari (7). Even

2.2 Noun classes in derived (reduplicated) numerals

in Konyagi, the fact of agreement is not clear because in this language the CM of ‘2’ in ‘200’ and ‘2000’ coincides with the CM of CL2 in independent use (for the same reason it is not clear whether we encounter agreement in Baga Foré (5). Moreover, there is no agreement in Nalu (6), a language of the same branch.

In the majority of languages, the noun classes of ‘200’ and ‘2000’ systematically differ from the noun classes of units and dozens. This is typical for Niger-Congo, perhaps because in ‘100’/‘200’ and ‘1000’/‘2000’ we are often dealing with borrowings.

Mel languages. The present analysis will be limited to the data from one Mel language, that is Temne (Kərata dialect) collected by David Odden (Table 2.15).

Table 2.15: Noun classes in Temne numerals

1	p-ín				
2	pí-ráŋ	20	ki-gbá		
3	pí-sas	30	ki-gbá ‘tɔ́-fót (20+10)		
4	pa-nlɛ	40	tí-gbá tí-ríŋ (20*2)		
5	tamát̩ 5 (*ta-tam-at)	50	= 20*2+10		
6	du-k-ín (X+1)	60	tí-gbá tí-sas (20*3)		
7	dɛ-ríŋ (X+2)	70	= 20*3+10		
8	dɛ-sas (X+3)	80	tí-gbá tâ-nlɛ (20*4)		
9	dɛ-ŋanlɛ (X+4)	90	= 20*4+10		
10	tɔ́-fót (< *ta-fu-at)	100	k-ɛmé k-ín	200	t-ɛmé tí'-ríŋ
		1000	Λ-wúl ‘ŋ-ín	2000	ɛ-wúl jɛ-ríŋ

The numerals ‘1–4’ in counting forms belong to CL.SG pV-. The numeral ‘5’ can be traced back to the form with positive meaning of definiteness (*ta-tam-at) – as well as 10 (< *ta-fu-at), initially having the structure CV-CVC-VC, where CV- and -VC are allomorphs of the noun class in a definite form and CVC is the root (Pozdniakov 1993: 143–144).⁵ For us, it is important that the numerals in ‘5’ and ‘10’ can be reconstructed with CL.SG ta-. The non-derived numeral ‘20’ can be traced to CL.SG, and in particular kɛ-. The numerals ‘40’ – ‘90’ are formed with the change of the noun class in the first formative to CL.PL tɛ-. Furthermore, the second formative agrees with the first one in noun class and consequently is also included in the class tɛ-. That is to say, this is the same derivational model as in

⁵It is clear that ‘5’ and ‘hand’ have assonance in the languages of the group. Due to space limitations, it is impossible to explain the complicated emergence of this assonance. Let’s also leave aside details on the first formative in the numerals ‘6–9’.

2 Noun classes in the Niger-Congo numeral systems

Bantu and in Atlantic languages. This model emerges as well in the formation of ‘100’ and ‘200’. In the borrowed form *keme* ‘100’ the initial root consonant can be interpreted as a singular CM (the same noun class as in ‘20’). That means that ‘200’ is used as its plural correlate and the original root consonant gives us *t-*. Finally, the correlation of ‘1000’ ~ ‘2000’ can be interpreted as correlation in number but with a new pair of classes: CL.SG Λ - ~ CL.PL ϵ -.

Gur languages. An example of an interesting system from the Ditammari language (Oti-Volta) follows (Table 2.16).

Table 2.16: Ditammari: agreement in the derived numerals

SG	PL-PL	SG
te-pii-te ‘10’	si-pi-si-dε ‘20’	dεε-ni ‘2’
	si-pi-si-tâadi ‘30’	tâadi ‘3’
	si-pi-si-wεi ‘90’	n-wεi ‘9’
di-tu-si-di ‘100’	yε-tu-si-ε yε-déε ‘200’	dεε-ni ‘2’
di-yɔɔ-di ‘1000’	yε-yɔɔ-d-ε yε-dè ‘2000’	

In this example we can see the correlation of number classes in derivatives and «agreement» between the parts of syntagm in ‘200’ and ‘2000’ using different structures of class markers (prefixes, suffixes, confixes, or the lack of marker).

Similar formation strategies of derived forms can be found in another language from the Gurma group (Oti-Volta), Miyobe (Table 2.17).

Table 2.17: Miyobe: noun classes in derived numerals

SG	PL, SG-PL, PL-PL	SG
kε-fi ‘10’	a -fεε-ré ‘20’	-té ‘2’
	a -fεε-na ‘40’	n -na ‘4’
pí-lε ‘100’	pí-lε-pí-lε mε -té ‘200’	
kú-kotokú ‘1000’	á -kotokú a -té ‘2000’	

In ‘20’ (10*2) and in ‘2000’ (1000*2) a plural correlate CL.SG **kV-** (CL.PL **á-**) is used. In ‘2000’ the numeral ‘2’ agrees in noun class with ‘1000’ (the root is formed from the word with the meaning ‘sack’). In ‘200’ the reduplication of ‘100’ and a special class marker (CL.PL **mε**) for the formative ‘2’ are used.

2.2 Noun classes in derived (reduplicated) numerals

Another language from Gurma group Ntcham follows the same standard model (Table 2.18).

Table 2.18: Ntcham: noun classes in derived numerals

	SG		PL-PL		SG
20	ín-mùḥkú	40	ì-mùḥkú ì-lí	2	ḥ-lí
100	dì-làátàà-l	200	kú-làáfàa-u		
1000	Ø-kùtùkú	2000	Ø-kùtùkú-bì bì-lí	2	ḥ-lí

The numeral ‘200’ is formed from ‘100’ by changing from the singular class to the plural one.

The existence of similar strategies for use of plural class markers for the formation of numerals of higher rank in different areas of Niger-Congo (Benue-Congo, Atlantic languages, Mel languages and Gur languages) permits us to presume that similar principles of interaction between noun classes and numbers were typical for the system of Niger-Congo as well. There are no traces of derivative pluralization in Kru and Ijo languages, but they can surely be found in Kwa languages. I did not manage to find similar strategies in the Adamawa and Ubangi languages, nonetheless traces can be found in Kordofanian languages.

Here is an example from Koalib, a Kordofanian language (Table 2.19).

Table 2.19: Koalib example

	SG		PL-PL		SG
20	t-úrì	40	r-úrì r-ìrèn	2	-ìrèn
		2000	á-lep (<arab.) w-ìrèn	200	mìe kw-ìrèn

A prefix for the plural class is used for the formation of the numeral 40. The formative ‘2’ in ‘40’ agrees with the formative ‘20’ in the noun class. In ‘200’ the prefix of singular class CL1 is used, which includes animated nouns and borrowings. In ‘2000’, in the formative ‘2’ is used for the prefix w-, a standard agreement marker for vocalic noun classes.

Traces of pluralization of noun classes as a means of derivation in numerals can be found in Moro and Acheron (both are Kordofanian languages).

This distribution gives us sufficient grounds to assume that derivation for the formation of dozens in Niger-Congo was similarly established in Proto-Niger-Congo.

2.3 Noun class as a tool for the formation of numerals

Finally, there is one (perhaps the most interesting) strategy for formation for derived numerals. It consists exclusively of changing the noun class for the formation of a derived form. The system from Efik is partially reported below (Table 2.20).

Table 2.20: Efik example

2	í-bá	40	à-bà
3	í-tá	60	à-tá
4	í-nárj	80	à-nàj

In Efik, as in the majority of Niger-Congo languages, a stable correlation in number CL5.SG ~ CL6.PL can be found: in Efik reflexes of these classes are accordingly í- ~ à-. A simple change of singular class to plural (with no compound forms and no reduplication) is enough to form ‘40’ from ‘2’, ‘60’ from ‘3’ and ‘80’ from ‘4’. Apparently, this system uses ‘20’ as its primary base.

The formation of new numerals by a change in noun class can be encountered in some languages of Benue-Congo, including Bantu (Table 2.21).

Table 2.21: Benue-Congo examples

Bantu-B80	Tiene (Tende)	4	i-nîi	40	mu-nîi
Bantu-C40	Sengele	4	í-nei	40	mo-nei
Bantu-C90	Ndengese	4	i-nej	40	bo-neji
Grassfields	Limbum	4	Ø-kjè:	40	m̄-kjè:
Edoid	Degema	2	i-βá	40	ɔ-βá

This technique is mostly used in Bantu languages within the zone J. The data reported in Table 2.18 does not necessarily signify that the conceptual base for derivation is the pluralization of original forms. In Tiene, Sengele, and Ndengese, derived numerals, as well as base numerals, belong to singular noun classes.

For example, for the languages J10 SG > SG is characteristic for four derivations which can be illustrated by Gundu language (Table 2.22).

Other derivations SG > SG can be found occasionally. Apparently, the forms *n-datu* ‘6’ > *tí-ratu* ‘60’ (CL9 > CL7) and *mú-nané* ‘8’ > *lú-nané* ‘80’ (CL3 > CL11) were encountered only in Tembo (J50). We can see that the choice of nominal classes

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Table 2.22: Gundu number patterns in the derivations of numerals

8 > 80		9 > 90		10 > 100		10 > 1000	
CL3 > CL7		CL3 > CL7		CL5 > CL7		CL5 > CL11	
8	mò-ná:nèí	9	m ^w è:- ⁿ dá	10	í-kùmí	10	í-kùmí
80	ki-na:nei	90	k ^j e:- ⁿ da	100	ki-kumi	1000	ru-kumi

differs in different languages, that is, it is not the symbolic semantics of nominal classes that is most important, but rather their paradigmatic modification.

In Bantu J10-J20 we find a triple derivation model CL5-*kumi* (or CL9-) ‘10’ ~ CL7-*kumi* ‘100’ ~ CL11-*kumi* ‘1000’. Thus in Hema, *i-kumi* ‘10’ ~ *ki-kumi* ‘100’ ~ *ru-kumi* ‘1000’.

This model can be found in Gur languages as well. In Nothern Nuni (Grusi group) dozens are formed exclusively by a change in noun class marker. The derivation from ‘20’ to ‘50’ is realized by the change of one singular class to another: *bi-là* ‘2’ > *fï-là* ‘20’, *bi-twàà* ‘3’ > *fï-twàà* ‘30’, *bi-nu* ‘5’ > *fï-nu* ‘50’. Formation of dozens by a change of class is encountered in some Senufo languages as well.

However, the derivational model SG > PL is much more active. In the Bantu zone J, six derivations are typical, illustrated by the following examples from Gwere (J10) (Table 2.23).

Table 2.23: Gwere number patterns in the derivations of numerals

2 > 20		3 > 30		4 > 40		5 > 50		6 > 60		7 > 70	
CL5 > CL6		CL5 > CL6		CL5 > CL6		CL5 > CL6		CL3 > CL10		CL3 > CL10	
2	ì-βírí	3	ì-sátú	4	ì-ná	5	ì-tá:nú	6	mù-kâ:gá	7	mù-sá ⁿ vú
20	à-βíri	30	à-sátù	40	à-nâ	50	à-tâ:nù	60	ṅ-kâ:gà	70	ṅ-sá ⁿ vú

For the numerals ‘20’–‘50’ CL6.PL is used, and for ‘60’–‘70’ CL10.PL is used. These classes demonstrate the correlation in number with the classes CL5.SG and CL3.SG respectively. In at least four languages in zone J, the model CL3.SG > CL10.PL was encountered for ‘9’ > ‘90’. In Gwere and Tembo, the model CL5 > CL6 is used in derivation ‘2’ > ‘20’: Gwere *ì-βírí* ‘2’ > *à-βíri* ‘20’.

Only one language, and that is Tembo, systematically presents model PL > PL in the derivation CL8.PL > CL6.PL (Table 2.24).

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Table 2.24: Tembo example

3	βi-hátu	4	βí-nε	5	βi-tánɔ	7	βi-rínda
30	má-hátu	40	má-nε	50	ma-tánɔ	70	ma-línda

This model is clearly secondary and was implemented as a result of re-interpretation, atypical of zone J, of classes in numerals ‘2–5’, ‘7’ as plural classes opposed to ‘1’.

The fourth theoretically possible model, that is PL > SG, has never been encountered in any derivation which can be considered indirect evidence for the idea that the pluralization of numerals of higher rank is one of the key strategies for the formation of derived numerals, as was demonstrated. Nonetheless, this strategy does not explain everything.

In order to present this elegant mechanism of systematic use of noun classes in the derivation of numerals in greater detail, an example from derivation in Soga using the roots ‘10’ and ‘2’ will be schematically presented. The root meaning ‘10’ matches in Soga with six different class markers, and the root meaning ‘2’ matches with three of them, as shown in Figure 2.1.

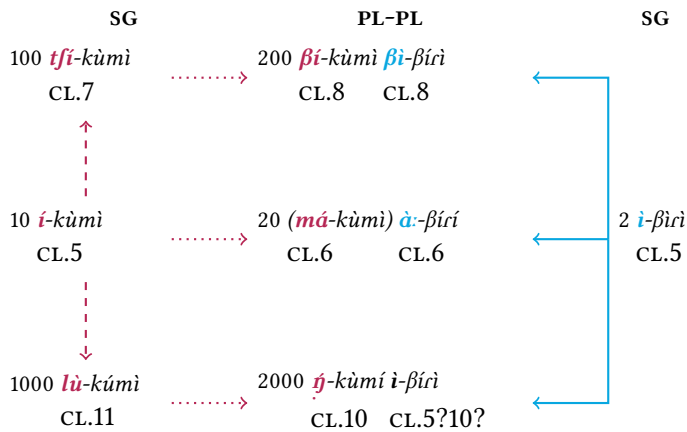


Figure 2.1: Soga numerals: derivations by noun classes

In the Soga language the root *kumi* takes part in three forms with singular class and three forms with plural class (one is facultative). In the derivations including forms of different numerals it is visible that the most stable correlations in number are: CL5-CL6, CL7-CL8 and CL11-CL10. However, the choice of CL7 and

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CL11 for the derivations (as shown in Figure 2.1) seems to be arbitrary. According to Larry Hyman (p.c.) in the dialect Lulamoji, the archaic form of the numeral '1000' belongs to the CL11 and not to the CL14 (Hyman: «*óBu-kumí* '1000', older usage»).

The root *βiri* does not take part in singular derivatives but was found in three derivatives where *kumi* is marked by plural class markers. The main derivative from *i-βiri* '2' can function separately outside of the word combination (*à-βíri* '20'). In this case, the main correlation in number for the class 5 is used (CL5-CL6). The difference in the class markers CL6 *ma-* and *a-* (in some dialects *ga-*) is related to the characteristics of the paradigms of agreement markers. A question about the nature of *i-βiri* in '2000' emerges. Does it belong to CL5 or is this an homonymous form of the agreement marker in CL10? These questions are very hard to answer because we are dealing with derivational forms of class markers (often homonymous) and we cannot check on the context of agreement in order to test it.

In fact, the number of classes in numerals (both singular and plural) can be even bigger. In Soga, a singular form of '8' *mù-ná:-ná* (CL3) is always formed from the numeral '4' *i-nà* (CL5). In Mpumpong (Bantu, A80), the system of numerals includes four different plural noun classes, that is CL8 for units - *tên nè i-nâ* '9' (5+4), CL6 - for dozens - *mè-kàm mè-mbá* '20'(10*2), CL4 for hundreds - *mì-tsět mì-mbá* '200' (100*2), and CL2 for thousands - *ò-tòsin ò-bá* '2000' (1000*2).

The model of formation that was masterly developed by Soga has major relevance not only for the history of numerals in Niger-Congo, but for the theoretical analysis of the semantics of noun classes as well. The signifier of morphemes in noun class paradigms has a multilayer structure. This structure presumes that the semantics of each class can be defined through the paradigm at the intersection of four parameters: classificational, paradigmatic, syntagmatic and modal (for a more detailed discussion see Pozdniakov 2003). It is useless to discuss the classificational aspect of noun class semantics in Soga numerals as we do when classes for humans, trees or animals are taken in consideration. The paradigmatic aspect of the signifier of the signs is the most relevant because the primary role is given to the correlation of classes in number, while some other paradigmatic correlations remain important as well.

In conclusion, it should be noted that the noun class switch as a derivation mechanism is not limited to Benue-Congo and can be reconstructed at the Proto-Niger-Congo level in at least one case (see Chapter 5).

3 Analogical changes in numerals

3.1 Issues pertaining to the detection of alignments by analogy

In addition to the grouping of numbers by noun class, a number of more radical strategies are used in the Niger-Congo languages. One of them is the formal alignment of numbers resulting from the diachronic alignment of forms by analogy. This strategy implies irregular phonetic changes in lexical stems. As a result, contiguous numerals in the Niger-Congo languages often have similar forms, that is they have common phonetic element(s).

Such cases are not easily distinguishable from phonetic similarities conditioned by morphological changes, when affixes that are no longer productive blend into lexical roots, for instance, or archaic noun class markers exist in the numerals. Thus, in Wolof, as shown in the introduction, phonetic similarities arise in the numerals ‘2’–‘4’ (*ñaar* ‘2’, *ñett* ‘3’, *ñeent* ‘4’) as a result of inclusion of the noun class marker Ñ in the lexical roots.

Only specialists of a concrete language can distinguish between morphological “accidents” and phonetic analogical changes, but sometimes even synchronic competence may not be enough. Table 3.1 shows the first six numerals in five Adamawa languages.

Table 3.1: Adamawa examples

Languages	‘1’	‘2’	‘3’	‘4’	‘5’	‘6’
(1) Tunya	sèlì	ari	ata	ana	aluni	nano
(2) Vere	muo	ituko	tariko	nariko	gbanara	baburo
(3) Mom Jango	muzoz	itez	taz	naz	gbana	babez
(4) Dirrim	nuan	bara	tara	nara	tona	tini
(5) Pere	dàǎ	irō	taǎrō	nārō	núnno	nóndóǎ (5+1)

In Tunya (1) it is clear that the initial a- in the numerals ‘2’–‘5’ etymologically has the nature of the noun class marker. In Vere (2) the final syllable -ko can

3 Analogical changes in numerals

hardly be considered a noun class marker, but it is very likely that we are dealing with a morpheme and not with a phonetic alignment of numerals. In Mom Jango (3) the final *-z* in '1'-'4' and '6' is difficult to comment on; it is likely that this is an analogical change but its direction is not very clear. In Dirrim (4) *bara-tara-nara* is the case of analogical change and, considering the diachronic context, the numerals '2' and '4' were clustered together with '3'. In Pere, the final *-o* in '2'-'5' may represent an analogical alignment or a morpheme.

Let us exclude all the cases of integration of noun class markers into stems and consider all the other cases of phonetic (or hidden morphological) clustering in the systems of numerals in Niger-Congo. We will deal mainly with two questions:

1. In which branches of Niger-Congo do analogical alignments have a major role and in which they are practically absent? This question is of crucial importance for the step-by-step reconstruction of numerals in Niger-Congo.
2. Which numerals phonetically align together and which analogical groupings are rare? This question is important not only for the etymology of numerals but also for the typology of analogical changes in numerals.

The topic of the present chapter is not relevant to all the branches of Niger-Congo. For instance, in Bantu and Benue-Congo there is no systematic analogic phonetic alignment. But in some other branches it is impossible to discuss the etymology of numerals without considering this factor. In the twelve main branches of Niger-Congo the situation is as shown in Table 3.2.

In the first three branches the minus does not mean that there is no phonetic alignment of numerals. Some examples from Benue-Congo languages are given in Table 3.3.

Each of these examples is interesting for the study of concrete languages, but these seem to be the only languages, among hundreds of BC languages, where analogical changes have been found; therefore, no systematic changes of this type for the BC family have been attested.

In Mel there is only one case which is of interest to us, that is the unification of the initial root consonant in Krim: *yi-gin* '2', *yi-ga* '3'. The direction of analogical alignment in this case is not clear. It is impossible to study this particular case here, because the discussion of possible hypothesis would require a separate publication. It is important to underline that in other Mel languages cases of phonetic alignment of numerals have not been attested.

There are virtually no unifications of this type in Kru, excluding the phonetic alignment of the initial consonant in '4'-'5', reported in Table 3.4.

3.1 Issues pertaining to the detection of alignments by analogy

Table 3.2: Analogic alignment in NC numerals

NC family	Analogy in numerals
1 Benue-Congo	–
2 Mel	–
3 Ijo	–
4 Kru	–?
5 Mande	–?
6 Atlantic	+
7 Kwa	+
8 Adamawa	+
9 Ubangi	+
10 Gur	+
11 Dogon	+
12 Kordofanian	+

Table 3.3: BC examples of analogic alignments

Language	‘1’	‘2’	‘3’	‘4’	‘5’
Gweno (E30)	-mwi	-vi	-tharu	-nya	-thwanu
Tiv	mòm’	har	-tar	-nyin	-tan
Mmen	mò?	bege	tege	kaiko	ta
Bute	mui	bam	tareb	nasib	-gi
Kila	mwe	han	tar	nar	tien
Mama	mo?on	mari	taru	la jinu	tonu

Table 3.4: Kru alignments in ‘4’-‘5’

Language	‘1’	‘2’	‘3’	‘4’	‘5’
Gbe	do	so	ta	hyi~	hm
Southern Grebo	do	so	ta	ha	*hm
Bassa	doo	so	ta	hiye	hín

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I will dare to assume (based on these data) that the initial consonant in ‘4’ has undergone analogical change with the consonant in ‘5’. The final judgment should be done by specialists. In Ijo this type of alignment is absent.

3.2 Mande

There are no systematic analogical changes in the systems of numerals in Mande languages.¹ Some languages like Busa, San (South-Eastern branch) and Soninke (Western branch) present exceptional cases.

In Busa, we are probably dealing with the fossilized suffix *-hō* which can be found inside the lexical roots of ‘3’ and ‘4’: **a-hō* ‘3’, **si-hō* ‘4’, i.e. the phonetic similarity can be explained morphologically.

In San, apparently, the regular reflex of the three different consonants of proto-language of South-Eastern Mande is *s-* (see 3.10 below). Finally, three of the contiguous numerals start with the same consonant: *so* ‘3’, *si* ‘4’, *soro* ‘5’.

Soninke represents a more complicated case, wherein the last vowel of each numeral is not distributed randomly (Table 3.5).

Table 3.5: Soninke

1	ba(a)ne	6	tu(n)mu
2	filo	7	nieru
3	siko	8	segu
4	(i-)nakato	9	kabu
5	karago	10	ta(n)mu

In ‘1’ there is a particular vowel *-e*. “Minor” numerals (‘2’-‘5’) have the final *-o*, and all the higher numerals (‘6’-‘10’) – final *-u*. Following the reconstruction of Nazam Halaoui (Halaoui 1990): *fill-a* ‘2’ (active voice) / *fill-e* ‘2’ (passive voice) > *fill-e-nu* (PL) ‘2’ > *fill-o* (PL) ‘2’. In other words, in the numerals ‘2–5’ the vowel *-o* is interpreted by Halaoui as a phonetically conditioned allomorph of the plural morpheme *-nu*. But in the numerals ‘6–10’ another vowel was found, not *-o*, but *-u*. Nazam Halaoui explains this in the following way: irregular final vowel *-u* initially appeared in the numeral ‘6’ as a consequence of progressive assimilation (**tunm-o* > *tunmu*), and then following the analogy this vowel appeared in

¹I would like to thank Valentin Vydrin for a detailed discussion of the history of numerals in Mande languages.

numerals ‘7’-‘10’. Halaoui’s hypothesis is not plausible (it presupposes a doubtful phonetic change **e-nu* > *-o* in the numerals ‘2’-‘5’), neither is it the only one possible.

Valentin Vydrin (2006: 171–204) shows that Soninke has two different plural suffixes, *-u/-o* and *-ni/-nu* (the allomorphs *-u* and *-o* are dialectal variants, the same is true for *-nu* and *-ni*). It is not quite clear, do we have the generic plural marker *-u* in all the numerals from ‘6’ through ‘10’, or whether it is the alternative plural marker *-nu* that appears in ‘6’ and ‘10’, while the generic plural *-u* appears in ‘7’ through ‘9’. In any case, it is evident that in the right column of Table 3.5, the final *-u* is of morphological origin, rather than a result of an analogical change. The fact of the appearance of a plural marker in the numerals ‘6’-‘10’ by itself is noteworthy; these numerals should be interpreted as pluralia tanta. Interpretation of the final *-o* in ‘2’-‘5’ is much more problematic. There is a singular morpheme *-o* in Soninke, however, Vydrin’s data do not clarify why it is *-o*, rather than *-e* or *-Ø*. Therefore, it can be conjectured that the final vowel of the numerals ‘2’-‘5’ result from analogical changes.

Now let us move to the branches where analogical changes are systematic. Even in these cases we will encounter different examples.

3.3 Atlantic

In Table 3.6, the data on the first five numerals in ten various Joola languages will be compared.

Table 3.6: Joola

Joola	‘1’	‘2’	‘3’	‘4’	‘5’
Joola Karon	ɔ-ɔnɔ(ɔ)l	supək	həɔciil	paakul	sak
Bayot	ɛ-ndon	i-rigəʔ	i-fiigiʔ	i-βeiʔ	ɔ-ɾɔʔ
Joola Gusilay	ya-nɔ	su-ruba	si-fegir	si-bagir	fu-tok
Joola Banjál	a-nu	si-gaba	gu-figir	si-bagir	fu-tok
Joola Fogny	yɛ-kon	si-gaba	si-fegir	si-bakir	fu-tok
Joola Mlomp	yɔ-nɔl	si-subel	si-hejil	si-bacil	ɲa-suwan
Joola Kasa	ya-no(r)	si-lube	si-heji	si-baki	hu-tok
Joola Ejamat	a-yinka	ku-lube	si-heji	si-bacir	fu-tok
Joola Kerak	ya-nɔr	si-sube	si-heji	si-bacir	hu-tok

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In the last group, apparently, there is no reason for the establishing phonetic alignments. In the meantime, in the first two groups such alignments are evident. In the first group the velar consonant is spread, and in the second group, the liquid consonant; furthermore, the roots are mostly related. These are classical “symptoms” of analogical change. It is clear that it is useless to etymologize the numerals without an in-depth analysis of these alignments.

Joola languages form one of the four branches of the Bak group in Atlantic. In Bijogo, there are no analogical changes in numerals. In the other two branches, these changes of various types can be found, and such changes differ from the type of changes in Joola.

In Pepel (Manjak branch) in some sources the numerals ‘2’ and ‘3’ have a final -s, in other sources they have a final -t and in Koelle (1963[1854]) the final consonants are different, which can correspond to the situation in proto-language (Table 3.7).

Table 3.7: Pepel

‘2’	‘3’	Source
pugus	ɲa-jens	Ndao 2011
pugut	waa-jint	Wilson 2007
ge-pugus	ga-cit	Koelle 1963[1854]

In the branch that is represented by isolated languages Balant (Senegal; according to the data from Creissels & Biaye 2015) for the numerals ‘2’ and ‘3’ the following forms exist (Table 3.8).

Table 3.8: Balant

2	3
CL-sibí	CL-hàbí ~ CL-yàbí
sùbí	yàabí

Apparently the numeral ‘2’ has undergone the analogical change following the numeral ‘3’. The sources on Balant Kentohe give different but also phonetically clustered forms: *-sebm* ‘2’, *-abm* ‘3’.

It is important to underline that analogical changes in the three aforementioned branches of Bak languages are not historically related – these changes

are of different origin. This means that for this group, the principle of phonetic alignments of numerals is characteristic, but different types of changes by analogy co-exist. A similar situation is also typical of Northern Atlantic languages, which show other types of phonetic alignments.

In Wolof, as previously mentioned, the alignment of the initial consonant in numerals '2'-'4' is of a morphological nature; these numerals maintain traces of the noun class prefix. Still, for native speakers these forms contain a similar phonetic marker that groups together the numerals for '2'-'4' and distinguishes them from other numerals.

In Sereer (Northern Atlantic), as in Joola (Bak Atlantic) the final velar can be clearly seen in the numerals '2'-'5': *fik* '2', *tadik* '3', *nahik* '4', *βetik* '5'. Here the clustering involves not only the final consonant but the precedent vowel as well, which creates an illusion of the existence of a specific morpheme ('suffix' *-ik*) used for marking the numerals '2'-'5'. As will be demonstrated later, this is a false intuition. In Sereer, for example, we deal with morphophonology and not with morphology. Moreover, the coincidence with Joola is not casual and reflects an important phonetic innovation which took place in Proto-Atlantic.

In Nyun (the branch Nyun-Buy, Northern Atlantic languages) form clustering occurs through the final velar *-k* as well: *-nduk* '1', *-nak* '2', *-re-nek* '4'. It is worth highlighting that the initial consonant of the aforementioned forms is also unified (*n-*).

The same isogloss can be encountered, although in its shorter version; in one of the five languages of the Cangin branch, that is in Palor, *ka-nak* '2', *ke-jek* '3'. For Cangin this alignment is definitely marginal, in all the languages of Cangin branch another analogical change is encountered: the initial consonant in the numerals '1'-'2' is unified, which is a rare phenomenon. In Proto-Cangin we have **ji-no?* '1', **ka-nak* '2' with the maintenance of the initial *n-* in all five languages (compare with the unifications in Nyun).

The final *-n* is the basis for phonetic alignment in Sua, though the affiliation to Atlantic languages has not been proven: *soŋ* '1', *m-cen* '2', *b-rar* '3', *m-nan* '4', *sugun* '5'.

3.4 Kwa

54 out of the 111 sources for Kwa languages available in our database show a common initial consonant *n-* for the numerals '4' and '5'. For example, in Nzema: *na* '4', *nu* '5'. In the other half of the sources forms with *n-* can be found for '4' and with initial *t-* for '5'; for example, in Gbe-Fon: *e-ne* '4', *a-ton* '5'. The latter

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forms correspond to Proto-Bantu numerals: **nàì* ‘4’, **táà̀nò* ‘5’. The question then arises: where do the forms for ‘5’ with initial *n-* come from?

Mary Esther Kropp Dakubu (Kropp Dakubu 2012) includes the forms of the numeral ‘4’ in the series of correspondences which go back to **n-* and reflect as *n-* in all of the main branches of the family except for Ga-Dangme (GD): Proto-Potou-Tano **-nã*, Tano **-nã*, GTM (Ghana–Togo Mountain) **-inâ*, Gbe *e-ne*. The author includes the numeral ‘5’ in the series 15b where Akan and GD both have *n-*, in Gbe *t-*, and inside GTM are both *t-* and *n-* (Na-Togo). Mary Esther Kropp Dakubu suggests the following historical interpretation of these forms:

The fact that GTM is reconstructed with **t-*, but its NA sub-group with **n*, suggests that the *n* of Akan and GD are also secondary, and that these forms are to be reconstructed as beginning in Kwa **t* (ibid., p.24).

All the details of complex reconstruction will not be discussed here, but this shows that modern Kwa languages come from *PTB (Proto-Potou-Tano-Bantu). It is worth underlining that the reported reconstruction does not explain why in some of the Kwa languages the numeral ‘5’ with initial **t-* has changed to *n-*. Furthermore, she does not explain why this irregular change has happened in the aforementioned languages and not in the others.

The most natural answer to the first question is that in some languages, in the numeral ‘5’ the initial consonant has undergone analogical change with the numeral ‘4’. As a result, the same consonant was formed in both numerals.

In order to answer the second question, it is necessary to observe the distribution of forms of ‘4’ and ‘5’ in different branches of Kwa, adding up in case of necessity forms for ‘3’ and ‘2’. In order to extend the analysis of Mary Esther Kropp Dakubu, the Lagoon languages will be added to her database (Table 3.9).

Table 3.9: Akan

Languages	‘2’	‘3’	‘4’	‘5’
Akan_Twi	abie-n	abie-sa	anan	anum
Ashanti	mie-nũ	mie-sã	enãn	enũm
Abron 1	mie-nu	mie-sa	nain	num
Abron 2	mie-nuk	mie-nzak	n-nai	n-num

In all the Akan languages the alignment can be observed not only in ‘4’-‘5’ but (probably morphologically) also in numerals ‘2’-‘3’ (this phenomenon cannot be

found outside this cluster). Furthermore, one of the sources clearly indicates a final velar in Abron. Table 3.10 reports data on the main languages of Central Tano.

Table 3.10: Central Tano

Language	'2'	'3'	'4'	'5'
Agni (Anyin)	ǰ̃-nua	n-sa	n-na	n-nu
Baule	ŋɔ	sa	na	nũ
Nzema ²	ɲ-ɲu	n-sa	n-na	n-nu
Anufo	ɲɔ	nza	na	nu
Baule (Baoulé) ³	ŋɔn	san	nan	nun
Ahanta ⁴	ayin	asan	anla	enlu

Nearly identical forms are found in the other three branches of Tano (Table 3.11).

Table 3.11: Krobu-Ega, Western Tano, Tano Guang

Branch	Language	'3'	'4'	'5'
Tano: Krobu-Ega	Krobu	n-sa	n-na	n-nu
Tano West	Abure	ŋ-ŋa	n-na	n-nu
Tano West	Eotile (Beti)	a-ha	a-ni	a-nu
Tano Guang	Dwang (Bekye) ⁵	a-sa	a-na	a-nu
Tano Guang	Ginyanga	i-sa	i-na	i-noun
Tano Guang	Foodo	sa	naŋ	nu/nuŋ
Tano Guang	Larteh	sa	ne	nu
Tano Guang	Cherepon	i-sa	i-ne	i-ni

²One of the sources on Nzema gives forms without an initial nasal: *sa* '3', *da* '4', *du* '5'. Let us note that even in this case the initial consonant is the same in the numerals '4' and '5'.

³In some sources Baule numerals '2'-'5' include also a final -n.

⁴Thus, in Ahanta the alignment of initial consonants for '4'-'5' is even more clear: **nl**-.

⁵The roots *-na* and *-nu* (for '4' and '5' respectively) can also be found in the Guang group in Awutu, Chumburung, Guang, Kplang, Krache, Nawuri, Nchumburu, Nkonya. For the subsequent exposition it is important that in all these languages the numeral '3' includes an initial *s*-.

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Among the numerous Tano languages there is just one language in our database which does not have initial *n-* in ‘4’ and ‘5’. This language is Ega, which is misleadingly put in the sub-group with Krobu; its attribution to Tano is also doubtful, according to the majority of specialists. The forms of these numerals provide one more argument against this grouping.

Some other languages display unification of the initial consonant in ‘4’-‘5’ outside of the Tano group.

As for Potou, forms with the initial *n-* in both ‘4’ and ‘5’: *ne-ni* ‘4’, *ne-na* ‘5’ were found only in Mbato, see Table 3.12.

Table 3.12: Potou

Language	‘3’	‘4’	‘5’
Mbato	ne-je	ne-ni	ne-na
Ebrie	bwa-dya	bwe-di	mwa-na

Examples from Mbato permit us to reconstruct the unification of the initial consonant in ‘4’-‘5’ in Potou-Tano. Outside of Potou-Tano this unification, following Mary Esther Kropp Dakubu, was found only in some languages of Na-Togo (GTM). The numerals in the languages of this group are represented in Table 3.13.

Table 3.13: Na-Togo

Language	‘3’	‘4’	‘5’
(1) Anii	i-riu	i-naŋ	i-nuŋ
(2) Logba	i-ta	i-na	i-nu
(3) Selee	o-tie	o-na	o-no
(4) Sekpele	cye	na	no
(5) Lelemi	i-ti	i-ne	i-lo
(6) Siwu (Akpafu)	i-te	i-na	i-ru
(7) Adele	a-si	i-na	ton

In languages (1–4) *n-* appears in ‘4’-‘5’ (Anii displays an utmost variant of alignment with the unification of the final consonant as well). In language (7) the most ancient proto-language initial *t-* is attested in ‘5’, and this means that a reconstruction of **n-* in ‘5’ for Proto-Na-Togo is problematic. Furthermore, in languages (5–6) there is no alignment of the forms.

In other Kwa languages consonants in ‘4’ and ‘5’ differ. To be more precise, in Adjoukrou initial consonants are aligned but they are not nasals: *jar* ‘4’, *jen* ‘5’. All the other forms can be grouped into four main types:

1. the “basic” type, where, as in Bantu-Kwa, there is **n-** in ‘4’ and **t-** in ‘5’;
2. the type where ‘4’ has initial **n-** while ‘5’ shows a phonetic change of the initial consonant;
3. the type where ‘5’ keeps **t-**, while ‘4’ shows a phonetic deviation;
4. the most complicated type for the analogical interpretation which has **n-** only in ‘5’ while ‘4’ has a non-nasal initial consonant.

I will provide some examples followed by interpretations.

Type 1 is illustrated in (Table 3.14).

Table 3.14: n- ‘4’, t- ‘5’ (t- ‘3’)

Group	Language	‘3’	‘4’	‘5’
Gbe	Aja	e-to	e-ne	a-to
Gbe	Ewe	e-to	e-ne	a-to
Gbe	Gen	e-to	e-ni	a-to
Gbe	Fon	a-to	e-ne	a-to
Gbe	Kotafon	a-to	e-ni	a-to
Gbe	Saxwe	a-to	i-ne	a-tu
Gbe	Xwla	a-to	e-ne	a-to
GTM	Kebu	ta	nia	to
Ga-Dangme	Dangme	e-to	e-ne	a-to
Ka-Togo	Akebu	ta	nie	tu
Ka-Togo	Ikposo-Uwi	i-la	i-na	i-tu
Na-Togo	Adele	a-si	i-na	ton

It is clear that the basic etymological forms are represented extensively. They are not confined to Potou-Tano or the Lagoon languages but they can be found in four other branches of Kwa as well.

Type 2 is illustrated in (Table 3.15).

⁶Harley (2005: 155) “With the exception of *m̄a* – ‘one’ and *nviã* – ‘two’, the citation forms of these numerals are derived using the expletive third person pronoun *ke*, which has become incorporated into the attributive numeral : *ke elale* ‘3’ > *kaale*, *ke ena* ‘4’ > *kena* ...”.

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Table 3.15: n- ‘4’, phonetic deviations in ‘5’

Group	Language	‘3’	‘4’	‘5’
Ka-Togo	Avatime	o-ta	o-ne	o-cu
Ka-Togo	Tuwuli ⁶	ε-lale	ε-na	e-lo
Na-Togo	Lelemi	i-ti	i-ne	i-lo
Na-Togo	Siwu (Akpafu)	it-e	i-na	i-ru
Lagoon	Avikam	a-za	a-na	a-ɲu

Type 2, like Type 1, is not difficult to interpret. In the single languages the reflexes of the original consonant are maintained in ‘4’, while in ‘5’ *t- undergoes phonetic changes.

Type 3 is illustrated in (Table 3.16).

Table 3.16: t- ‘5’, phonetic deviations in ‘4’

Group	Language	‘3’	‘4’	‘5’
Ka-Togo	Igo (Ahlon)	i-ta	a-la	u-to
Ka-Togo	Nyangbo	e-tae	e-le	e-tie

The proto-language consonant is maintained in only two languages in ‘5’ (Ka-Togo and GTM) while the initial consonant in ‘4’ undergoes regular phonetic change.

And finally, the most difficult type 4 is illustrated in (Table 3.17).

Here we see all the counter-examples against the hypothesis on the change *t- > n- in ‘5’ as analogous to n- in ‘4’. The solution is to imagine that in certain languages belonging to different branches of Kwa (independently from each other), firstly, this analogical change occurred, the original *n-, which was the basis of the analogical change, but was then lost in the numeral ‘4’.

Finally, let us get back to the question raised above: why does analogical change in ‘5’ take place in only some Kwa languages? Let us have a look at Table 3.18, where different initial root consonants in numerals ‘3’-‘5’ within different groups of Kwa are presented.

In the Kwa languages we see a clear tendency: in languages with the initial plosive *t- > fricative s-, the described analogical changes can be found. Where the plosive is maintained, this change is more difficult and can be found in only some

Table 3.17: n- in ‘5’ but not in ‘4’

Group	Language	‘3’	‘4’	‘5’
Potou	Ebrie	bwa-dya	bwe-di	mwa-na
Potou	Gã	e-tě	e-jwe	e-nũmo
Lagoon	Abé(Abbey)	a-ri	a-le	u-ni
Lagoon	Abiji	e ^h -ti	a ^h -la	e ^h -ne
Nyo?	Ari (Abiji)	e-ti	a-la	e-ni
Central Tano	Ahanta	a-sa	a-la	e-nũ
Ga-Dangme	Dangme	e-te	e-ywi/e-wi	e-nuo
Lagoon	Alladian	a-o	a-zo	e-nri
Lagoon	Adioukrou	pa-hn	ya-r	ye-n

Table 3.18: Kwa initial consonants in ‘3’-‘5’

Group	Bantu-Kwa	Tano	Tano	Tano	Tano	Gbe	GD	GTM
Sub-Group		Krobu	Central Tano	Akan	Guang	Gbe	Gan-Dangme	Ka-Togo
‘3’	*t	s	s	s	s	t	t	t
‘4’	*n	n	n	n	n	n	j/y	n
‘5’	*t	n	n	n	n	t	t	t

of the languages (for example, some of the above-mentioned Na-Togo cases). In this case we have not *t- > n- ‘5’, but *t- > s- > n. This observation can be interesting as a candidate for analogical changes – maybe, ‘weak’ consonants (for example, fricatives) can be more easily involved in analogical processes than ‘strong’ ones (plosives).

It is curious that this analogical isogloss can be found in a number of other branches of Niger-Congo, including Adamawa, Gur and Dogon (as well as Seenku from the Mande family).

3.5 Adamawa

In Adamawa the above-mentioned analogical change can be found in at least a dozen of languages (Table 3.19).

However, in Adamawa, analogies are much more widespread than in Kwa. For instance, in Gimme the numerals ‘2’-‘7’ share the same final syllable (morpheme?). In Chamba, only one similarity can be found for ‘4’-‘5’ and for ‘2’-‘3’

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Table 3.19: Initial n- in '4'-'5' in Adamawa languages

Language	'2'	'3'	'4'	'5'	'6'	'7'
Tula	rop	ta	na	nu		
Kwa	negbe	ne mwan	ne nat	ne nu		
Burak	rab	gbunuŋ	net	nob		
Chamba	bara	te-ra-	nasa	tu-na-		
Kolbila	inu	tonu	nereb	nunub		
Bangunji	yob	tar	nar	nuŋ		
Yendang	ini	tat	nat	ghi-nan		
Dadiya	yo	tal	nal	nu		
Peere	iro	taro	naro	nuno		
Samba Leko	kira~kire	ture	nara	nunak		
Gimme	idtige	tage	nage	nonige	nonge	nokidtige

(the final syllable *-ra*). In Kolbila, the situation is quite similar to the one in Chamba ('2'-'3' share the same final syllable *-nu*) and in '4'-'5' both the initial *n*- and the final *-b* coincide.

Phonetic alignment follows more interesting models in Bangunji, Yendang, Dadiya, Peere and Samba Leko. In these languages, on the one hand, '4'-'5' are still grouped together (because of the initial consonant) and, on the other hand, ('2')-'3'-'4' are also grouped (because of the final syllable). The numerals with the meaning '4' have two simultaneously distinct features which mark two separate groupings. As a result, peculiar minimal pairs arise formed by contiguous numerals; for example, in Yendang: *tat* – *nat* '3'-'4', *nat* – *nan* '4'-'5'.

Another alignment of numerals (2), '3'-'4' takes place in Adamawa where there is no alignment in numerals '4'-'5'. Minimal pairs like in Dirrim *bara* '2' – *tara* '3' – *nara* '4' are a very widespread phenomenon for the languages within this family. Some examples are presented in Table 3.20.

This kind of assonance may seem insignificant, but I would like to underline once more that among hundreds of Benue-Congo languages, it is impossible to find any similar case.

Table 3.20: Adamawa analogical alignments in ‘3’-‘4’

Language	‘1’	‘2’	‘3’	‘4’
Vere (Mom Jango)		ituko	tariko	nariko
Galke (Ndai)			ca-?a-	na?a
Dama			sa-i	nai
Mono			sai	nai
Mundang			sa-i	nai
Pam			sa-i	nai
Fali			tan	nan
Kam			car	nar
Bali			tat	nat
Kumba			sat	nat
Teme			tat	nat
Waka			tat	nat
Yendang			tat	nat
Wom		ira	tara	nara
Taram		bara	tara	nara
Fanya		liru	taro	naro
Duupa		ito	tato	nato
Kotopo	wate	i-to	tato	nato
Mom Jango	muzoz	itez	taz	naz

3.6 Ubangi

Ives Moñino (1995) has reconstructed unified forms for ‘3’-‘4’ and partly for ‘5’ in Proto-Gbaya. These forms resemble the above-mentioned “minimal pairs” in Adamawa. In Proto-Gbaya: **tar(a)* ‘3’, **nar(a)* ‘4’, **mor* ‘5’ (notably, the numeral ‘5’ coincides with the word ‘hand’). In Ubangi-Sere, a different type of alignment can be found – the final **-o** in numerals ‘2’-‘5’ (in Ubangi-Zande – the final **-i**) (Table 3.21).

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Table 3.21: Final vowel alignments in Ubangi

Language	‘2’	‘3’	‘4’	‘5’
Ndogo	so	tao	nao	vo
Sere	so	tao	nao	vo
Tagbu	so	tao	nao	vuo
Pambia	a-vai	wa-tai	(h)avai	boinyaci

3.7 Gur

In some languages of the Gur family analogical changes in ‘4’-‘5’ can be found, as observed in Kwa and Adamawa (Table 3.21).

Table 3.22: Gur initial n- in ‘4’-‘5’

Language	‘2’	‘3’	‘4’	‘5’
Baatonum	yiru	ita / yita	ne	nobu
Chala (dial.)	-la	-toro	-nara	-nuj
Buli	ba-yi	ba-ta	ba-nasi	ba-nu
Dagaara	ayi	ata	a-nar	a-nu
Delo	ala	atoro	a-nara	a-noj
Ditammari	deni	tati / tadi	na	numu
Nawdm	mrek	mtak	m-na	m-nu
Safaliba	ayik	atak	anaasi	anu

Like in Chamba (Adamawa), some of the Gur languages have a common feature not only for ‘4’-‘5’ but also for ‘2’-‘3’. For instance, in Nawdm and Safaliba, as can be deduced from Table 3.22, the numerals ‘2’-‘3’ have a final velar consonant. The final velar can be found in ‘2’-‘3’ in Hanga (*a-yik* ‘2’, *a-tak* ‘3’), and in Dogose it is found in ‘2’-‘5’: *i-yok* ‘2’, *i-sak* ‘3’, *i-yik* ‘4’, *i-wak* ‘5’. Gudrun Mieke (Mieke et al. 2007: 157) shows in Khisa (Komono) the final -ʔ in ‘2’-‘5’: *ɲóʔ* ‘2’, *sáaʔ* ‘3’, *ɲééʔ* ‘4’, *ɲwááʔ* ‘5’.

And finally I would like to report a rare case of strong alignment between the numerals ‘1’ and ‘2’ in Mbelime: *yēnde* ‘1’, *yede* ‘2’.

3.8 Dogon

Assimilation of the initial consonant in ‘5’ to the initial consonant **n-** in ‘4’ (for example, Tommo So: *nay* ‘4’, *no* ‘5’) is characteristic of practically all the Dogon languages and should be reconstructed already for the Proto-Dogon. Other types of unification cannot be found in this family.

3.9 Kordofanian

Phonetic/morphological alignments in this family are quite rare. In what follows, the most interesting cases are reported (Table 3.23).

Table 3.23: Kordofanian alignments

Group	Languages	‘1’	‘2’	‘3’	‘4’	‘5’
Talodi	Tocho	puluk	we-rak	wa-tak		
Talodi	Jomang	y-illik	y-ilrak	y-idak		
Talodi	Nding		-eta	t-atak	-ibipnik	
Talodi	Tegem	tléedi	paderig	padaig		
Katla	Katla	te:ták	sek			
Orig	Orig				arum	wuram
Katla	Tima		ehek	ehoat	ehalam	

In Talodi the final velar is present, similarly to other branches of Niger-Congo. Some cases of phonetic alignment can be found, though this alignment is reserved to singular languages rather than to the whole family.

In sum, the data examined in this chapter can be found in Appendix C where 50 different cases of probable analogical changes in Niger-Congo are highlighted. The Table in Appendix C permits the evaluation of the scale of analogical changes in the system of numerals in Niger-Congo in general.

It is worth mentioning that in the cases where numerals ‘6’-‘10’ are not derived, it is very unusual to find phonetic alignment in them (exceptional systems, such as that of Soninke, were previously discussed). For this reason, only the numerals ‘1’-‘5’ are included in Appendix C. Three main questions are to be answered concerning these numerals: 1) Which groupings of numerals are most typical for the Niger-Congo languages when we deal with analogical changes? 2) Which phonetic (or hidden morphological) means are used to produce the alignment of

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numerals? 3) Are there any reasons to consider that similar analogical changes in different branches of Niger-Congo can be diachronically related? Otherwise, can these materials be useful for the study of other isoglosses in Niger-Congo?

As demonstrated in Appendix C, mostly contiguous numerals are aligned (see some rare examples above, for example in Nyun languages, where features for '1'-'2'/'4' are shared, but not for '3').

It is quite rare that '1' shares a submorphemic marker with the numeral '2', while for other contiguous numerals this is more common. Such rare examples are found in Ha (Bantu J) and in Mbelime (Gur). In both languages the forms of numerals '1' and '2' have minimal phonetic difference. As will be demonstrated in the following sections dealing with the etymology of numerals '1' and '2', the forms in Ha (*mbele* '1', *bhili* '2') are of great interest for the diachronic interpretation of numerals.

As can be seen in Appendix C, the final phonemes have phonetic alignment much more often than the initial ones.

The appearance of the diachronically irregular initial *n*- in the numeral '5' as analogous to the regular form of the numeral '4' represents a common feature in different families of Niger-Congo: Potou-Tano (Kwa), Adamawa, Gur and Dogon. More attention should be paid to this phenomenon because it is unlikely that one analogical feature could appear in four different branches of Niger-Congo independently.

There are two remarkable cases in the alignment of final phonemes which are typical for several branches of Niger-Congo.

Firstly, there is the appearance of a final velar (-*k*) in the groupings of the numerals '2'-'5', '2'-'4', '2'-'3', '3'-'4' (in Kordofanian and Atlantic also '1'-'2'-'3'). This feature is typical for the Atlantic, Adamawa, Gur and Kordofanian groups (thus, one more common feature can be found for Adamawa-Gur). In Benue-Congo and Mande the reported examples are clearly marginal.

Secondly, similarly to the regular dental reflexes of the final consonant in the numeral '3' (*-*t(h)*), in '4' the final consonant undergoes an irregular change (non dental consonant becomes dental). This type of change is particularly characteristic for Atlantic, Adamawa and Gbaya (Ubangi), but it is also found in Kordofanian and in Benue-Congo, which do not have analogic changes as characteristic features.

The most common case is the appearance of the identical final vowel in some languages of different families (mostly in numerals '2'-'5'): Mama (Bantoid), So ninke (Mande), Peere (Adamawa) and Ndogo, Pambia (Ubangi).

All the reported cases should be taken into consideration for the process of etymologization of numerals, which will be done in the following chapter.

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

In this chapter we will try to create a step-by-step reconstruction of numeral systems for each separate family independent of the data from the other NC families. For each family we shall examine the range of basic numerals from '1' to '10' and then the numerals for '20', '100' and '1000'. We begin our overview with the largest family, Benue-Congo.

4.1 Benue-Congo

There is no Benue-Congo classification that is accepted by all scholars. As noted, the inventory of Benue-Congo groups mainly follows the classification of Kay Williamson (1989b: 266–269). We repeat here the scheme of BC given above, in the introduction as Table 4.1.

Table 4.1: Benue-Congo languages

*Western BC	*Eastern BC	Isolated BC
Nupoid	Kainji	Oko
Defoid	Platoid	Akpes
Edoid	Cross	Ikaan
Igboid	Jukunoid	Lufu
Idomoid	Bantoid	

Let us begin our overview with the largest group of Bantoid languages.

4.1.1 The Bantoid languages (including Bantu)

The reconstruction of numerals in the Bantoid languages is based on 140 sources for the major branches of this family. What follows is the result of our step-by-step analysis of numeral systems in these languages.

4.1.1.1 ‘One’

We shall collect the main forms for ‘1’ in different branches of the Bantoid languages. The last column of Table 4.2. shows some isolated forms for ‘1’ which seem to be innovations.

At first glance, the terms for ‘1’ in the majority of the Bantoid languages appear to be quite homogeneous, their roots being traceable to either **mo?* or **moi/mwi* of uncertain etymology. The misleading similarity of the Bantu roots *mòì*, *mòdì*, *mòtì* may be due to the merger of the noun class prefix **mò-* with the nominal base.¹ This hypothesis (developed in detail in Vanhoudt 1994) has now found its way into the BLR (cf. BLR3 *sub mòdì* (NC): ‘*plutôt mò-òdì: voir Vanhoudt 1994*’).

Among other common Bantu forms are *mòcà* (zones KN), *mòtì* (ABCEGHKLRs) < **mò-òtì*, *móégá* (zones BH) (BLR3: *mòì* + suffix), and *mòì* (ABCDEFGHIJKLMRS). As will be shown below, the presence of a nasal prefix in the Bantoid numerals is suggested by the distribution of these forms in Benue-Congo. Those BC branches that have nasalless roots within the nominal classes ‘one’ and ‘three’ lack the terms for ‘one’ with a nasal consonant.

This interpretation, however, does not address two major issues, namely 1) whether the forms in question (e.g. **-òdì/-oti/-o?i²*) consist of one or more roots and 2) whether the open back vowel belongs to the root.

A solution to the former problem may turn out to depend on how the latter is treated.

Within the context of Niger-Congo, it is conceivable that the Proto-Bantu *òdì* may go back to **ò-dì*, with **ò-* being a marker of the NC noun class 1 (**ko-/ ?o-* according to my reconstruction). This hypothesis will receive a more detailed treatment in the next chapter. At this point, we will only note that it is quite problematic to explain the common reflexes of **-dì*, **tì*, and **ʔ-* in Bantu within this hypothesis. Moreover, the etymological relationship between these roots (disregarding **dì* and *mɔ(m)* (Tivoid), *ó-mè* (Mbe), *ma* (Mamfe), etc.) would be much less transparent than that in case of *modì ~ motì* or even *-odì ~ -oti*.

¹I agree with Larry Hyman who reacted to this point: “This would suggest that ‘1’ was a noun; possible, just like ‘10’, but note that ‘2’-‘5’ are not nouns!” (p.c.).

²Larry Hyman: “The glottal stop goes back to a velar in Grassfields; it could be either alveolar or velar in Tikar”.(p.c.).

Table 4.2: Bantoid stems for ‘1’

Branch	Language	‘1’	‘1’	‘1’
Northern				
Dakoid	Chamba-Daka			nòòní
*Mambiloid		mwi	cin, jer	wuni ^a
Fam				
Tiba (Fà)			à-kīn-á	
Southern				
*Bantu ^b		mòì/mòdì, mòtí		p/m/b-ókó
*Beboïd		mwi/mu		baka, kpaŋ
*Yemne-Kimbi		mwe		
*Ekoid			ji(ŋ)/rəŋ?	yet? ^c
*Jarawan		mo?		(dík)
*Mamfe		mɔt/ma		
*Mbam		mwe/mù?		
Mbe	Mbe	ó-mè		
Ndemli	Ndemli	mðhó		
Tikar	Tikar	mbɔ?		
*Tivoid		mɔ(m)		
*Esimbi				nə
Wide Grassfields	Befang	mo?		
GF: Mbam-Nkam	Bamileke	mo?		cu
GF: Mbam-Nkam	Ngemba	mɔ?ɔ		
GF: Mbam-Nkam	Nkambe	mo?(sír)		
GF: Mbam-Nkam	Nun	mo?		
GF: Momo		mo?		fɪŋ
GF: Ring		mo?		

^aThe Fam and Tiba (Fà) forms are quoted according to Blench (n.d.[b]) and Boyd (1999) respectively. The online version of Boyd (<https://hal.archives-ouvertes.fr/hal-00323718v3>) differs from the printed one.

^bAn asterisk (*) in the second column of the tables (here and below) means that in the corresponding line all the forms are reconstructed. However, with the exception of the Proto-Bantu line, which indicates real reconstructions in BLR3 (*), all other reconstructions are hypothetical (#) and reflect the most typical form/forms attested in a particular branch of Benue-Congo. Forms that may be related are grouped in tables within the columns. The last column of the tables shows isolated forms that are likely to be innovations.

^cConcerning the form *yet* in Ekoid, I quote a precious remark of John Watters (p.c.): “The actual root for Proto-Ekoid may be -t ~-d. The /aŋ/ in some Ekoid languages may be an accretion. The *yét* morphologically is /yé-t/ with the CV being a class agreement prefix, and -t being the root. So the -t may be closer to the Bantu *moti*. I’m not sure how *ó-mè* in Mbe figures in with the rest of Ekoid, but one possibility is that the -mè root derives from /me-t/. Ekoid needs further work”.

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The secondary PB form **ókó* (zones ABCHF) (BLR3: "Janssens 1994: alternance C1 p/m/b-ókó- protoforme secondaire, cf. 'seul'") is comparable to **baka* (Bebidoid: Fio *mbákâ* ~ *nbáhá*, Nchane (Mungong) *m⁴ba³ka⁴*). It should be noted that the above considerations allow us to explain the initial consonant (and the following back vowel) in these forms as noun class morphemes, too.

The Northern Bantoid *kin/cin* is remarkable and will be addressed later in this chapter.

The Bamileke **tfu* (Fefe *fu?*, Medumba *antʃu?*, Nda'nda' *ɲtʃɔ?*, etc.) is possibly related to the Bantu **tv* (BCDEGLP) 'alone, empty, vain'.

4.1.1.2 'Two' and 'Three'

Without exception, the reconstructed root for 'two' in all Bantoid branches has an initial labial consonant, either voiced (b-) or voiceless (p-/f-). A more precise reconstruction of the proto-form is beyond my cognizance. The forms cited above do not permit a conclusion with regard to the number of roots involved (one or two). When comparing the most commonly attested forms **pa/fe* and **baa*, it is necessary to keep in mind that at least the Proto-Bantu **bàdí/bidí* could be a reflex of **di*. In the case of *ba-* the proto-form should be interpreted as a prefix of a plural noun class (possibly class 2).³ The latter proposal finds support in the dialectal Proto-Bantu form *jòdè* (zones BH) (< **jò-dè?*). The main forms show the following zonal distribution: *bàdí* (ABCHKLR), *bidí* (CDEFGJKLMNPS), *bídí* (?).

It was repeatedly stressed that the root for 'three' (**tat*) is one of the most stable in NC and in the Bantoid languages in particular. Phonetic variation within this root will be studied in Chapter 5.

4.1.1.3 'Four' and 'Five'

The well-known NC root **nai* 'four' is represented in all of the pertinent languages. The only exception is Grassfields, where it was replaced with the innovative **kwa/kya*. According to Roger Blench, Momo *-kpi* and Ring *kaikò* as well as the Proto-Eastern Grassfields **kùà* go back to the Proto-Benue-Congo #-*kpà(ko)* (Blench 2004: #387). This root, however, is commonly found in Mbam-Nkam, i.e. in all Grassfields languages, and is barely attested outside this branch.

³John Watters: "This analysis, if correct, could work also for most of Bantoid. So Ekoid would derive from *ba-* prefix and *-l* ~ *-d* ~ *-n* root. However, the /b/ may derive from /p/. Ekoid may derive from **-pal* and then you have the many other Bantoid languages with /p/" (p.c.).

Table 4.3: Bantoid stems for ‘2’ and ‘3’

	Language	‘2’	‘2’	‘3’
Northern				
Dakoid	Chamba-Daka		bààrá	tárā
*Mambiloid		fee/fal/hal	baa	taar
Fam			baale	tawnə
Tiba (Fà)			à-ḃēēr-á	à-tár-á
Southern				
*Bantu			bàdí/bìdí	tátò/cátò
*Beboid		fe		tat, te
*Yemne-Kimbi		fi(n)		to
*Ekoid			ba(l)	sa/ra
*Jarawan			ḃar	tat
*Mamfe		pay/pea		rat/lə
*Mbam		fande?	bante?	tat
Mbe	Mbe	p ^w âl		sá
Ndemli	Ndemli	ifé		ítáá
Tikar	Tikar		ḃî	lê
*Tivoid		hal/har/vial		tat
*Esimbi		ra-kpə?		kələ (<*lə?)
Wide Grassfields	Befang	fe		tái
GF: Mbam-Nkam	Bamileke	pu/pwe	bo/bie	tat
GF: Mbam-Nkam	Ngemba	paa	baa/bəgə	tarə
GF: Mbam-Nkam	Nkambe		baa	tar
GF: Mbam-Nkam	Nun	paa	baa	tət
GF: Momo			be	tat
GF: Ring			bo/ba	tat

The root for ‘five’ is almost invariably **tan*. One possible exception is the Ekoid form, unless **don/ron/lon* (Ekajuk *nlon*, Ejagham *érôn*, Nkem-Nkum *írôn*) is a reflex of **tan*.

It should be noted that the Ndemli root *it/ijè* may be related to *kwV* in the Grassfields languages. As we hope to demonstrate below, this is probably not a coincidence.

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Table 4.4: Bantoid stems for ‘4’ and ‘5’

		‘4’	‘4’	‘5’	‘5’
Northern					
Dakoid	Chamba- Daka	nàà-sá		túùná	
*Mambiloid		na(n)		tien/tin/con/son	ngii?
Fam			daare	tʃwiine	
Tiba (Fà)		à-nè-á		à-tᵛᵛᵛᵛ-á, tùuᵛ	
*Bantu		nàì/(nàí)		táànò/cáànò	
Southern					
*Beboid		na, ne		ti(n)	
*Yemne-Kimbi		nì			kᵛᵛᵛᵛ don/lon ⁴
*Ekoid		nì			
*Jarawan		yi-ne?		towun/twan	
*Mamfe		n(w)i		ta(y)	
*Mbam		nì(s)		taan	
Mbe	Mbe	nî		tʃân	
Ndemli	Ndemli		itʃijè	ítâᵛ	
Tikar	Tikar	ᵛî		ʃǣ	
*Tivoid		ᵛi(n)		tan	
*Esimbi		ᵛi		tənə	
Wide Grassfields	Befang		k ^u à (kᵛà)	it'êᵛ	
GF: Mbam-Nkam	Bamileke		kwa/kwo	tan	
GF: Mbam-Nkam	Ngemba		kwa/kya	taa(n)	
GF: Mbam-Nkam	Nkambe		kwe/kye	tan/ton	
GF: Mbam-Nkam	Nun		kwa/kpa	tan/tən	
GF: Momo			kwe	tan	
GF: Ring			kwi/kye/tsə	tan	

4.1.1.4 ‘Six’

The Grassfields languages show a common root **toʔo*. Outside Grassfields, it is attested only in Ndemli (just like the Grassfields root for ‘five’) and thus can hardly be reconstructed for Proto-Bantoid. However, we cannot exclude this, if PB **tᵛᵛᵛᵛá’6’* attested in zones ABCD is related to the Grassfields forms.

⁴John Watters: the Proto-Ekoid probably is **-ron* (p.c.).

Table 4.5: Bantoid stems and patterns for ‘6’

		‘6’	‘6’	‘6’	‘6’
Northern					
Dakoid	Chamba-Daka			<5?	
*Mambiloid				5+1	
Fam				5+1	
Tiba (Fà)				5+1	
Southern					
*Bantu		tándà <3redupl.?	tóóbá		càmb-, kaaga so
*Beboid					
*Yemne-Kimbi		3PL?			
*Ekoid		3+3			
*Jarawan				5+1	
*Mamfe					kene?
*Mbam		3PL		5+1	
Mbe	Mbe	3+3			
Ndemli	Ndemli		tóhó		
Tikar	Tikar	3PL?			
*Tivoid		3redupl., 2*3?			
*Esimbi		<3redupl.?			
Wide Grassfields	Befang		ndòfú		
GF: Mbam-Nkam	Bamileke		toyo		
GF: Mbam-Nkam	Ngemba		toʔo		
GF: Mbam-Nkam	Nkambe		ntunfu		
GF: Mbam-Nkam	Nun		ntúwó/tuʔo		
GF: Momo					foy
GF: Ring			tufa		

As in some other NC branches, three patterns that can be used to derive ‘6’ from ‘3’ are attested in the Bantoid languages (the following observations are even more relevant in the case of the patterns for ‘eight’ based on ‘four’):

1. The change of a class prefix (or its addition): Ajumbu *tò* ‘3’ > *k’à-tò* ‘6’; this pattern is possibly attested in Tutomb (Mbam) *pé-dààt* ‘3’ > *pí-tfín-dit* ‘6’, Elip *bó-dáḡ* ‘3’ > *bó-thín-dàḡ* ‘6’ (this pattern is marked ‘3PL’ in the table above). To strengthen the etymology for ‘six’ in Tutomb, it should be noted

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that in Tunen (another Mbam language) that has **tat* ‘3’ > *lal* (*bé-láló*), the term for ‘six’ also contains [l]: *pé-léⁿdáló*.

2. The combination of ‘three’ and ‘two’: Lyive: *hjàl* ‘2’, *tàt* ‘3’, *kàlà-kà-tàt* ‘6’ (<‘2*3’?).
3. The reduplication of ‘three’ (or the simple addition ‘3+3’): Ekajuk *n-ra* ‘3’ > *n-ra-ke-ra* ‘6’, Ejagham *é-sá* ‘3’ > *è-sá-gà-sá* ‘6’, Nkem-Nkum *i-ra* ‘3’ > *i-ra-ra* ‘6’, Mbe *bé-sá* ‘3’ > *bè-sè-sár* ‘6’, Tiv *ú-tár* ‘3’ > *á-tér-á-tár* (this pattern is marked as ‘3+3’ in the table above).

The Kenyang (Mamfe) form *bé-tándàt* ‘6’ (cf. *bé-rát* ‘3’) deserves special discussion. This form is reminiscent of the common Bantu form *tándà* ‘6’ attested in zones DGM. Its extended variant *tándàtò* is found in EFGJS, while the GNS zones use the form *tántàtò* which is even more interesting. Are the Bantu *tándà* forms cited above based on ‘3’? If so, **tat-tat* > *tatat* (*tántàtò*) in the languages to which Dahl’s law is applicable as well (> *tandat*, *tanda*).

In this case, the form *tòsóbá* (zones ABCD) that can be interpreted as ‘*3*2’: **tat-X-ba* may also be a derivative form.

If so, the aforementioned Bantu forms (as well as the Kenyang form) are probably not innovations. They may reflect a Proto-Bantoid model where ‘six’ is based on ‘three’. It should be noted that a close parallel to the Kenyang form is attested in the Mbam branch: Nomaande *be-tíndétú* ‘6’.

In sum, it appears that the most probable word-formation pattern for ‘six’ in Proto-Bantoid is ‘3+3’ or ‘3PL’.

4.1.1.5 ‘Seven’

The case of ‘seven’ seems pretty straightforward. In the majority of the Bantoid branches (including Bantu) the root is **samba/camba*. However, there is still a question whether this root is indeed primary: its Bantu reflex is strikingly similar to the root for ‘six’. Table 4.7 shows some selected examples.

It is noteworthy that the terms for ‘six’ and ‘seven’ show similarity not only in case of the root in question, but in case of other roots as well, e.g. J50: Fuliiru - *lindátù* ‘6’ ~ *-linda* ‘7’, Shi *ńdarhu* ‘6’ ~ *ńda* ‘7’. This similarity is usually conditioned by one of the following factors:

- the terms for ‘six’ and ‘seven’ follow the patterns ‘10–4’ and ‘10–3’ respectively: Yeyi (Bantu R40) *vùndzà é néé* ‘6’ (‘10’ ‘break’ ‘4 (fingers)’), *vùndzà é táâ:tô* ‘7’ (‘10’ ‘break’ ‘3 (fingers)’). This, however, is very rarely attested.

Table 4.6: Bantoid stems and patterns for ‘7’

		‘7’	‘7’	‘7’	‘7’	‘7’
Northern						
Dakoid	Chamba-Daka					dùtìm
*Mambiloid					5+2	
Fam					5+2	
Tiba (Fà)					5+2	
*Bantu		càmbà-dì/càmbò-à-dì	6+1?			púngàtí
Southern						
*Beboid		fumba?	6+1	4+3		
*Yemne-Kimbi				4+3		
*Ekoid		sima?		4+3?		
*Jarawan					5+2	
*Mamfe			6+1			
*Mbam			6+1			
Mbe	Mbe				5+2	
Ndemli	Ndemli	sà ^m bá				
Tikar	Tikar	jâmbì				
*Tivoid			‘6+1		5+2	
*Esimbi					5+2	
Wide Grassfields	Befang			4+3		
GF: Mbam-Nkam	Bamileke	samba				
GF: Mbam-Nkam	Ngemba	samba				
GF: Mbam-Nkam	Nkambe	samba				
GF: Mbam-Nkam	Nun	samba		4+3		
GF: Momo		sambe				
GF: Ring		samba				

Table 4.7: Similarities between ‘6’ and ‘7’ in Bantu

		‘6’	‘7’
PB		càmbànò (HL)/cààmànò (ABCHLR)/càmbombo (L)	càmbà-dì/càmbò-à-dì
A40 Bankon		bi-sámà	bi-sàmbòk
A80 Kol		twáb	tábel
B20 Mbangwe		-syami	ntsaami
B60 Mbere		-syaami	ntsaami
B70 Teke-Tege		ósàmini	ónsààmì
B80 Tiene		ísyam	nsam
C40 Sengele		ísama	ísambiálé
C90 Ndengese		isamo	isambé

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- the term for ‘seven’ is based on ‘six’ (‘6+1’). This pattern is much more common (see Table 4.8).
- The similarity may also be due to the derivation of these terms from ‘five’ using ‘5+1’ and ‘5+2’ patterns, respectively (this is the most common case). It should be noted that there is another, much less transparent pattern for ‘seven’ (‘X+2’ or ‘5+X’). It is frequently attested not only in the Bantoid languages, but also in the Mande languages.
- Finally, we may be dealing with an alignment by analogy.

Table 4.8: Common stems for ‘6’ and ‘7’ in Bantu

	‘6’	‘7’
J50 Fuliiru	-lindátù	-linda
J50 Shi	ńdarhu	ńda
A80 Byep	tʷóp	tʷóp ɓàl (6+?)
C10 Yaka	βúè	βúè nà -mòtí (6+1)
D30 Budu	mèdîà	mèdîànikà (lit: níkà ‘to come’)
M20 Malila	ómɔt ^h a: ⁿ da	ómɔt ^h a: ⁿ da na jè:k ^h a (6+1)
B10 Myene	òrówá	òrwáyénô (6+1)

Table 4.9: ‘6’ and ‘7’ from ‘5’ in Bantu

	‘6’	‘7’
H10 Koongo	sàmbánù	sàmbú-wàlì (wàlì ‘2’)
K20 Nyemba	pàndù	pàndù vâlì (-valì ‘2’)
K60 Mbala	sambanu	nsambwadi (mbadi ‘2’)
L30 Luba-Katanga	isamba	isambaibindi (ibindi ‘2’)
R10 Khumbi	epándú	epándúvalí (valí ‘2’)

Staying within the Bantoid family, it is difficult to say which of these explanations should be applied in the present case. If it is alignment by analogy, we should reconstruct a Proto-Bantoid primary root **samba/camba* for ‘seven’ and then explain the many irregular shifts in the forms of ‘six’ (e.g. t > s) by analogy with this root (as shown above, the Proto-Bantu ‘six’ is based on ‘three’ (*tat)).

We may also be dealing with a derived proto-form **sam-ba/cam-ba* with the second element probably going back to ‘two’.

4.1.1.6 ‘Eight’

Both Grassfields and Ndemli share the common primary root for ‘nine’ (**famV*). We have already seen this distribution, which only suggests that Ndemli belongs to the Grassfields branch (at least on the basis of their numeral systems). The majority of other branches point to the reconstruction of the term for ‘eight’ as

Table 4.10: Bantoid stems and patterns for ‘8’

		‘8’	‘8’	‘8’
Northern				
Dakoid	Chamba-Daka			7+1
*Mambiloid				5+3
Fam				5+3
Tiba (Fà)				5+3
Southern				
*Bantu		nainai(4 redupl.)/ nake		
*Beboid		ɲaŋ (<4?)		
*Yemne-Kimbi		4 redupl.		
*Ekoid		4+4		
*Jarawan				5+3
*Mamfe		4PL		
*Mbam		4 redupl.		
Mbe	Mbe	4 redupl.		
Ndemli	Ndemli		fɔ:mó	
Tikar	Tikar			
*Tivoid		4 redupl.		
*Esimbi		4 redupl.		
Wide Grassfields	Befang		éfómó	
GF: Mbam-Nkam	Bamileke		fum/hum/fo?	
GF: Mbam-Nkam	Ngemba		famə	
GF: Mbam-Nkam	Nkambe		waami	
GF: Mbam-Nkam	Nun		fame	
GF: Momo			fami/foŋ	
GF: Ring			faamə	

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based on ‘four’ (either by means of reduplication or by the noun class switch, or both).

4.1.1.7 ‘Nine’

Table 4.11: Bantoid stems and patterns for ‘9’

		‘9’	‘9’	‘9’	‘9’	‘9’
Northern						
Dakoid	Chamba-Daka					kúūm
*Mambiloid			5+4			
Fam			5+4			
Tiba (Fà)			5+4			
Southern						
*Bantu		bùá	5+4		10-1	kèndá/ jèndá
*Beboid		bùkə?				fumbɔ?
*Yemne-Kimbi			5+4			
*Ekoid			5+4		10-1	
*Jarawan			5+4			
*Mamfe					8+1	
*Mbam			5+4		8+1	
Mbe	Mbe		5+4			
Ndemli	Ndemli	bù?è				
Tikar	Tikar		5+4?			
*Tivoid			5+4		8+1	
*Esimbi			5+4			
Wide Grassfields	Befang		5+4			
GF: Mbam-Nkam	Bamileke	fu?u				
GF: Mbam-Nkam	Ngemba	bu?u/pu?u				
GF: Mbam-Nkam	Nkambe	bù?á? búum?			10-1?	
GF: Mbam-Nkam	Nun	pu?u?				cipo?
GF: Momo		bok				ko?
GF: Ring					10-1	

It seems likely that there was a primary root for ‘nine’ in Proto-Bantoid. It can be tentatively reconstructed as **bukV*.⁵ In Bantu, this root is found in the ABCDHL zones. The most common pattern ‘5+4’ (as well as the less frequently attested ‘10–1’) often develops independently in various languages. A marginal pattern ‘8+1’, attested in Mamfe, Mbam and Tivoid is noteworthy. Because of its rarity, it is relevant for the genetic classification of the Bantu languages, since it is hard to imagine that this form developed independently in each of these branches. The last column of the table below lists bases that are exclusively found in a specific Bantoid branch.

4.1.1.8 ‘Ten’

At least two Bantoid roots (**fu* and **kum/ kam*) may be useful for our reconstruction purposes. Both of them are attested in no fewer than six of the Bantoid branches (note also the Chamba-Daka *kúūm* ‘nine’). The Mambiloid languages show the greatest variety of roots.

It should be noted that a separate Proto-Bantoid form for ‘ten’ is not traceable in some of the pertinent languages. Despite this, it has been preserved as a part of the term for ‘twenty’, e.g. ‘ten’ is attested as *é-pó:t* in Ipulo (Tivoid). This form is probably related to Tiv *pùè/ púwè* and Lyive *epùè* and may be attested in the Mbam branch as well (Nubaca *mwa-pwat* ‘ten’, etc.).

It is clear, however, that the Ipulo ‘twenty’ (*i-ham*) is derived from the Proto-Bantoid term for ‘ten’ by means of a noun class switch. The same can be applied to Bhele (D30): *mókó* ‘ten’ but *e-kómi í-balé* ‘20’ (*í-balé* ‘two’). The root *kam* will be discussed below in connection to the terms for ‘hundred’.

⁵John Watters: “Given the distribution of these forms for ‘nine’ I would conclude that Proto-Bantoid likely used 5+4 and that **bukV* was an innovation in the pre-Bantu era when Proto-Bantu had not yet separated from what became Grassfields and other closely located Bantoid groups”.

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Table 4.12: Bantoid stems for ‘10’

		‘10’	‘10’	‘10’	‘10’	‘10’
Northern						
Dakoid	Chamba-Daka		kúūm- kóréró			
*Mambiloid				cóŋ		job-, jer, jula ? féŋ ?
Fam Tiba (Fà)						kwoy à-wóḡb-á
Southern						
*Bantu			kómi/ kámá			dòngò
*Beboid		jo-fi/jo- fu				
*Yemne-Kimbi		jo-fu		koŋ?		
*Ekoid		fo				gol, wobo lum
*Jarawan						
*Mamfe		fia, bjo				
*Mbam					p-wat/b- wad	
Mbe	Mbe	fwór				
Ndemli	Ndemli		džòm			
Tikar	Tikar		wúm			
*Tivoid		pue	*ham		pɔt	
*Esimbi						bu yu? (<9?)
Wide Grassfields	Befang		éyúm			
GF: Mbam-Nkam	Bamileke		ɣám			
GF: Mbam-Nkam	Ngemba		ɣám			
GF: Mbam-Nkam	Nkambe		?um			ri/ru
GF: Mbam-Nkam	Nun		ɣom			
GF: Momo			ɣum			
GF: Ring			ɣəm			

4.1.1.9 ‘Twenty’

It is not necessary to quote the forms for ‘twenty’, since in the majority of the Bantoid branches (including Bantu) this term is based on ‘ten’ and follows the pattern ‘10*2’. Some minor but peculiar variations should be noted here, but all of them are of little significance for our reconstruction. E.g. the term for ‘twenty’ often employs the plural noun class with the two components in agreement. However, non-compound forms based on ‘ten’ or ‘two’ in the plural are also attested. For instance, in one of the Bafut dialects *báà* ‘two’, *tà-wúm / nì-wúm* ‘ten’ > *mì-wúm mí-mbáà* ‘twenty’, while *tà-ghúm* ‘ten’ ~ *mì-ghum* ‘twenty’ in another. At the same time, Limbum *bá*: ‘two’ ~ *m-bá*: ‘twenty’. These patterns (especially the former) are common in the majority of the Bantu languages as well.

Primary roots for ‘twenty’ are rarely attested. They may go back to the lexical base ‘man’ (e.g. in D30 Komo *nkpá búí* ‘twenty’ = ‘whole person’), ‘head’ (Suga (Mambiloid)) *ḥḥḥ bíb* ‘twenty’ < *ḥḥḥ* ‘head’) or some other lexical bases (e.g. Bantu A50: Bafia *ì-tín/mà-tín* ‘twenty’ < ‘score’).⁶

4.1.1.10 ‘Hundred’ and ‘thousand’

It appears that the term for ‘hundred’ cannot be reconstructed for Proto-Bantoid: in most of the branches the pattern employed is ‘20*5’,⁷ whereas in some of the branches the term is borrowed. Both Grassfields and Bantu show innovations. The Grassfields root may be tentatively reconstructed as **ku*. Several roots are known for Bantu, their use being limited to certain zones: *kámá* ABCDHL, *gàná* DEFGJNPS, *tva* DL, *jànda* MNP. None of these roots is attested with this meaning elsewhere in the Bantoid languages, except for Bantu. The similarity of *kámá* with the root reconstructed for ‘ten’ is noteworthy. Moreover, it is attested with the meaning ‘thousand’ in at least three of the Bantoid branches as the table below shows (Table 4.14).

The root *kam* allows multiple interpretations. We will return to it after the evidence from other Benue-Congo branches has been examined.

⁶John Watters: “The Bakor group of Ekoid attest something like **-tên* and Mbe has *-têl*. The other two Ekoid groups have a form *-rim* or *-sam*. I would reconstruct for Proto-Ekoid **-têl* or **-tên* which is like Bantu Bafia. They are a few hundred kilometers apart with many languages and a significant mountain range in between, so this is not borrowing” (p.c.).

⁷John Watters: “The distribution of this form is suggestive of an older vigesimal system for Bantoid rather than a decimal one. I would take the decimal ones as innovations” (p.c.).

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Table 4.13: Bantoid stems for ‘100’

		‘100’	‘100’	‘100’	‘100’	‘100’	‘100’
Northern							
Dakoid	Chamba-Daka	20*5					
*Mambiloid		20*5					<fula
Southern							
*Bantu						kámá, gànà, tʷa, jànda	
*Beboid				gbi			
*Yemne-Kimbi				gbi?ɲwe?			
*Ekoid		20*5					
*Jarawan			10*10			luru?	<Hausa
*Mamfe		20*5					
*Mbam							<Engl.
Mbe	Mbe	20 *5					
Ndemli	Ndemli					mbókó	
Tikar	Tikar					ndu?	
*Tivoid		20*5					
*Esimbi			10*10				<Engl
Wide Grassfields	Befang					bòmí ⁿ dáŋgàŋ	
GF: Mbam-Nkam	Bamileke					k(h)u	
GF: Mbam-Nkam	Ngemba					k(h)i/kirə	
GF: Mbam-Nkam	Nkambe					ɲkà?	rdzèè?
GF: Mbam-Nkam	Nun					ɲku	
GF: Momo						ki, ko	
GF: Ring						ɣí/vi	ntu?

Table 4.14: Bantoid stems for ‘1000’

		‘1000’	‘1000’
Northern			
Dakoid	Chamba-Daka		100*10
*Mambiloid			ndúúŋ ‘sack’, <Fula
Southern			
*Bantu			nùnù, pòm̀b̀ì, k̀ót̀ò
*Beboid			cuku
*Yemne-Kimbi		kam?	kia?
*Ekoid			200*5?
*Jarawan			?
*Mamfe			nka?
*Mbam			<Engl.
Mbe	Mbe		400*2+200
Ndemli	Ndemli		kòlí
Tikar	Tikar	ɲkæm	
*Tivoid			20*10, engl.
*Esimbi			<engl
Wide Grassfields	Befang		ítʃán ~ étʃán
GF: Mbam-Nkam	Bamileke		tʃa/sa?
GF: Mbam-Nkam	Ngemba	kamə?	tsuʔu?
GF: Mbam-Nkam	Nkambe		cuki?
GF: Mbam-Nkam	Nun		100*10
GF: Momo			<engl
GF: Ring		kam	

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The Proto-Bantoid numeral system can be reconstructed as in Table 4.15.

Table 4.15: Proto-Bantoid numeral system⁸

1	m-o-ʔ, m-o-i, m-o-ti, mo-di	7	samba/camba (<*c/saN+2?)
2	pa/fe, badi (*ba-di?)	8	na-nai (<4 redupl.)
3	tat	9	bukV
4	nai	10	fu, kum/kam
5	tan	20	10*2
6	ta-ta(t) (<3 redupl.?)	100	gbi? ki? 20*5? kam?
		1000	?

According to Kay Williamson, the base for ‘one’ in Benue-Congo should be reconstructed as *#-kani*. The only form quoted in support of this hypothesis in her first article (Williamson 1989b: 255) is a supposed Bantoid reflex of the root in Tiba (*a-kina* ‘1’). Later (Williamson 1992: 396) she adduced one more Bantoid form, a Southern Bantoid Esimbi term *keni* ‘1’. That Williamson gives too much weight to these two marginal Bantoid forms is evident from the fact that she reconstructs this base not only for Benue-Congo, but for Niger-Congo as well. This leads her to the idea (probably expressed in the latter work for the first time) that Niger-Congo originally roots had a triconsonantal structure, hence her reconstruction of the proto-form for ‘one’ as ***-'kə'gəni*. This Niger-Congo etymology will be studied in detail below. At this point we will only note that the Esimbi form cited above is strikingly unusual for the Bantoid languages and was probably misinterpreted. The form *kēnə* ‘1’ is indeed attested in some of the Esimbi sources (see Brad Koenig, <https://mpi-lingweb.shh.mpg.de/numeral/Esimbi.htm>). However, in other sources the form *ɔ-nə* is attested (Cristin Kalinowski in (Chan)), so the term for ‘eleven’ is *bùyù nə-nə* (*bùyù* ‘10’). In other words, the base for ‘one’ in Esimbi is *-ni/-nə* (!), while the first syllable should be interpreted as the noun class prefix, just as in other numerals (cf. the forms *mərākpə* ‘2’, *mōpī* ‘4’, *mātānə* ‘5’, etc. in Koenig).

As for Tiba, it is still not certain whether this language indeed belongs to the Bantoid group (cf. Boyd 1999, where Tiba is considered an Adamawa language). The only Bantoid forms that could have been used by Williamson in support of her hypothesis are found in some of the Northern Mambiloid languages, cf. Twendi (Cambap) *tʃinī*, Mambila *tʃén* (with palatalization assumed). However,

⁸My competence does not allow me to reconstruct the tones in the numeral Bantoid languages, especially in Benue-Congo.

these forms are extremely marginal as well, so they cannot give ground for the proto-language reconstruction (in any case, not for Proto-Bantoid).

4.1.2 Benue-Congo (the Bantoid languages excluded)

After the numerals of the Bantoid languages, let's consider the numerals in each of the other groups within this vast family, namely Cross, Defoid, Edoid, Idomoid, Igbooid, Jukunoid, Kainji, Platoid, Nupoid (Sections 4.1.2.1–4.1.2.9) and in some isolated BC languages – Ikaan, Akpes, Oko and Lufu (Sections 4.1.3.1–4.1.3.4). After this, we will generalize the results obtained in order to try to reconstruct the numerals of Proto-BC (§4.1.4).

4.1.2.1 Cross

Let us consider the typical stems for numerals in the Cross languages.

Table 4.16: Cross stems for '1'

	'1'	'1'	'1'	'1'
1. Bendi				
Bendi	ken		-bónhè?	
2. Delta-Cross				
Upper		ni (D ⁹ : *g ^w á-ni)	wòn, guŋ?	móò?
Central		nin		
Lower	sin/cin, ki/ge, kiet/keed (D:*cèèd)			
Ogoni	zìì	nɛ(n)		

Let us dwell on this table, using it as an example for understanding the majority of the subsequent tables given in this book. Almost every table represents the synthesis of the primary data. We cannot publish all of these primary forms. Let's make an exception. In order to make clear to the reader on what basis the generalizations were made, we present in Appendix D all the forms available for the numerals '1' in the Cross languages, including intermediate Proto-Upper

⁹Here and below, index D introduces the reconstruction proposed by Dimmendaal (1978).

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Cross and Proto-Lower Cross reconstructions, proposed by Dimmendaal (1978) and Connell (1991). From the Appendix D, it is clear that Connell accepts the Dimmendaal hypothesis, according to which in Upper Cross **g^wá-* is interpreted as a prefix, and the lexical stem is represented by **-ni*, attested also in Central Delta-Cross and Ogoni. Based on the 60 sources listed in Appendix D, in table 3.15 for the numeral ‘1’, the root *ni(n)* is allocated. The table also identifies the second root for ‘1’, also possibly represented in the three branches of their five. Connell reconstructs it as **cèèd*, but the data from various Lower Delta-Cross, as well as from Dendi, suggests that perhaps we are dealing with a palatalization of the velar before the front vowel: **ked / ket / kin > ced / cin* (unfortunately, for most groups of the Niger-Congo, including Cross, we do not have sufficient grounds for reconstructing the tones). Finally, the third root presented in Icheve *á-mɔɔ* is probably related to Bantu.

‘Two’ (Table 4.17)

Table 4.17: Cross stems for ‘2’.

	‘2’	‘2’	‘2’
1. Bendi			
Bendi		fe, ha?	
2. Delta-Cross			
Upper		fa(n)/poo (D: *ppán)	
Central			jal/yal/zal/wal
Lower	bà (D: *íbà)		
Ogoni	bàè/berɛ		

The roots **bae* and **po/pa* are noteworthy.

‘Three’ and ‘Four’ (Table 4.18) The common Niger-Congo roots are attested for these numerals in all of the branches (**ta(t)/ca(t)* and **na(n)* respectively).

Table 4.18: Cross stems for ‘3’ and ‘4’

	‘3’	‘3’	‘4’	‘4’
1. Bendi				
Bendi	kie/cia/cat		ne	
2. Delta-Cross				
Upper	tat/tan/*sa, kia(t) (D: ttán ~ ttáD)	naan?	na (D: *nàŋì ~ này)	
Central	sar/rar		ɲa	
Lower	tá (D:*ítá)		nàaŋ/nìàŋ (D:*ìniàŋ)	
Ogoni	taa		nia	3+1

‘Five’ (Table 4.19) Two roots can be postulated for Cross, namely **tan* and its alternative, tentatively described as **gbo(k)*.

Table 4.19: Cross stems for ‘5’

	‘5’	‘5’	‘5’
1. Bendi			
Bendi	taŋ		dʲoŋ
2. Delta-Cross			
Upper	táón/tāŋ/zen/cen	gbo/buo(k)	
Central		oŋ/wɔ?	
Lower	tîŋ/tin/tion, go? (D:*ítíòn)		
Ogoni	*rè	ʔòò/vòò/wò/*ʔa	

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‘Six’ to ‘Nine’ (Table 4.20) At this stage it seems reasonable to maintain the forms and patterns represented in the last line of the table.

Table 4.20: Cross stems and patterns for ‘6’-‘9’

	‘6’	‘6’	‘6’	‘7’	‘8’	‘9’
1. Bendi						
Bendi	5+1			5 + 2	5 + 3	5 + 4
2. Delta-Cross						
Upper	5+1		ránē , 3+3	5+2, 4+3	4+4	10-1, 5+4
Central		di(n)		d̥uəl/d̥uən	4PL	súyó
Lower	5+1			5+2	5+3	5+4
Ogoni	5+1	nìŋĩ?	ŋòrò?	5+2	5+3	10-1, 5+4
CROSS	5+1	di?	3+3	5+2	4+4	10-1, 5+4

‘Ten’, ‘Twenty’, and ‘Hundred’ (Table 4.21) It should be noted that providing a detailed reconstruction for each of the Cross numerals lies beyond the scope of the present investigation, so there is probably no point in trying to establish which of the roots for ‘ten’ (**kpo* or **job*) should be reconstructed in the Proto-Cross (especially impossible without external evidence).

The Cross languages are highly divergent in regard to numerals (an exception should be made for ‘three’ and ‘four’ which are remarkably stable in Cross, as well as in the other NC branches). However, the forms cited above do not provide sufficient reason to suggest a closer relationship within any randomly selected pair of the Cross branches. Hence, it would be too daring to interpret the roots attested in both of these branches as shared innovations. Let us count the numbers of related numeral forms in different pairs of the Cross branches (Table 4.22).

This distribution is remarkable with regard to the total absence of shared forms (with the ‘three’ and ‘four’ excluded) between Bendi and Central Cross. Keeping this in mind, all of the established alternative roots and patterns can be reserved for a later discussion. At this point the following reconstruction of the Proto-Cross numerals can be suggested (Table 4.23).

Table 4.21: Cross stems and patterns for '10', '20' and '100'

	'10'	'10'	'20'	'20'	'20'	'100'
1. Bendi						
Bendi	kpu, hwo, fo		ci/si		jam	20*5
2. Delta-Cross						
Upper		jo(b)/zob/ jop (D:*jòb)	ti	lop, nip (D:*níb)	zol ...	20*5
Central		díob		lisiíβ/rusuβ	poγ, 2PL	kùròn, 5*20, 80+20
Lower	kəp (D:*lùgòp)	duob/duop, dugu/lugu		e-dip (D:*édíp)		i-kie (D:*íkiè)
Ogoni	òb, ʔò				tub/cu	5*20
CROSS	kpo	job	ti/ ci?	dip?		20*5

Table 4.22: Number of related numerals in different pairs of the Cross branches

	Central	Lower	Ogoni	Upper
Bendi	0	4	4	5
Central		2	2	4
Lower			5	4
Ogoni				4

Table 4.23: Numeral system of Proto-Cross(*)

1	*kin/cin, *ni(n), *gboŋ/gwan	7	5+2
2	*bae, *po/pa	8	4+4
3	*ta(t)/ca(t)	9	10-1, 5+4
4	*na(n)	10	*kpo/kop, fo? ʔo? *job
5	*tan, *gbo(k)	20	*ti/ci ? dip ?
6	5+1, di?, 3+3	100	20*5

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4.1.2.2 Defoid

The Defoid branch is relatively compact: it is composed of four languages including Yoruba and its dialects. Historical phonetics of these languages should be considered for a proper reconstruction of the Defoid numeral system, because most of the terms show great phonetic variety. E.g. for ‘four’ several forms are attested: *-ne* (Arigidi), *-jē* (Ayere), *-rin/-hē/-ē* (Yoruba), *-lè* (Igala). The main forms are given in Table 4.24, and their reconstruction will be discussed below.

Table 4.24: Defoid numerals

	Arigidi (dial.)	Ayere (dial.)	Yoruba	Igala	*Yoruba- Igala	*Proto- Defoid
1	ké-ɲē	ĩ-kǎ	ē-ní, ð-kǔ	é-ɲé/ò-ká	*ɲé, ka(n)	*ɲé, ka(n)
2	ké-ji	ì-dzì	è-ji	è-dzì	*ji	*ji
3	ke-dà	ĩ-tā	è-tā	è-ta	*tā	*tā
4	ke-ne	ĩ-jē	è-rĩ	è-lè	*le(n)	*le(n)/ ne, je
5	ké-ntò	ĩ-tǔ	à-rú	è-lú	*lú(n)	*lú(n)/tu(n)
6	ke-fà	ì-fà	è-fà	è-fà	*fà	*fà
7	ke-phi	ĩ-dz ^w ĩ	è-jē	è-b ^l e	*byē	*byē
8	ke-rò	ĩ-rò	è-jō	è-dzɔ	*jō	*jo/ ro
9	ké-ndà	ĩ-dǎ	è-sǔ	è-lá	*sá(n)	*sá(n), dà
10	ké-è	ĩ-g ^w á	è-wá	è-g ^w á	*gwá	*gwá
20	u-gbòrò	ē-gbòlò	ò-gú	ó-g ^w ú	*gwú(n)	*gwú(n)/ gbolo
100	20*5	20*5	20*5	20*5	20*5	20*5

Following the Proto-Yoruba-Igala reconstruction (Pozdniakov, ms), the terms **le(n)* ‘4’, **lú(n)* ‘5’ and **sá(n)* ‘9’ are reconstructed on the basis of the following regular phonetic correspondences (Table 4.25).

These examples illustrate the phonetic correspondences coming from *l ‘(Table 4.26).

Table 4.25: Fragment of the Yoruba-Igala phonetic reconstruction

	Yoruba	Igala
*l	r	l
*r	r	d
*d	d/j	d
*n	l/n	n
*s	s	l
*ʃ	s	r
*c	ʃ	c

Table 4.26: *L-stems in Proto-Yoruba-Igala and their regular reflexes

Meaning	*Yoruba-Igala	Yoruba	Igala
animal, meat	élṣ	ərṣ	éla
toad	àkèlé	àkèré	àkèlé
four	èlì	èrì	èlè
five	èlù	àrù	èlu
ant	èlilà	èèrà	èlilà
ashes	élílú	eérú	élúlú
feel	gbó òlílù	gbó òórù	é-gbúlù
star	ilàwò	ìràwò	ilàwò
small	kékélé	kékeré	kékélé
buy	là	rà	é-là
see	lí	rí	é-lí
plow	lo	roko	é-lo
body	óla	ara	óla
word	òlà	òrò	òlà
sun	ólílù	òòrù	ólù
sleep	oólù	oorù	ólu
neck	ólù	orù	ólò
thirst	òlùgbà	òrùgbà	òlùgbà
ring	ólù-ìka	òrùka	èlika
run	sVlé	sáré	é-rulé
fat	ùla	òrà	ùlà
seed	úlú	irú	úlú

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Yoruba [s] is correspondent to Igala [r] (<*f) or [l] (<*s) in at least six examples, see Table 4.27 below.

Table 4.27: Reflexes of *f and *s in Yoruba-Igala

Meaning	*Yoruba-Igala	Yoruba	Igala
leg	éʃè	əsè	érè
fruit	èʃo	èso	èro
block/ close	ʃé	sé	é-ré
launch	ʃɔ	sɔ	é-rɔ
nine	èʃú	èsú	èlá
sleep	sù	sù	*é-lu-

The reconstruction of the term for ‘seven’ (*byē) is based on the following correspondences (Table 4.28).

Table 4.28: One more fragment of the Yoruba-Igala regular correspondences

	Yoruba	Igala
*by	j	by
*j	j	j
*b	b	b

The reflexes of *by- can be represented as follows (Table 4.29).

Table 4.29: Reflexes of *by in Yoruba-Igala

Meaning	*Yoruba-Igala	Yoruba	Igala
dog	abyá	ajá	abyá
blood	èbyè	èjè	èbyè
seven	ebye	èje	ebye

Finally, the terms *gwá ‘10’ and *gwú(n) ‘20’ are reconstructed in view of *gw > Yoruba w (before [a])/g (before [u]) ~ Igala gw (Table 4.30).

Table 4.30: Reflexes of *gw in Yoruba-Igala

Meaning	*Yoruba-Igala	Yoruba	Igala
ten	ègwá	èwá	ègwá
beans	ègwà	èwà	ègwà
dig	gwà	wà	é-gwà
swim	gwà	wè	é-gwà
sweat	(ò)úgwù	òógù	úgwù
bone	égwúgwú	egũgũ	ógwúgwú
ascend	gwù	gù	é-tə-gwù
war	ógwũ	ogũ	ógwu
twenty	ōgwú	ōgú	ó-gwú
vulture	úgwúnú	igúnugú	úgwúnú

These correspondences are treated here in detail because they may be of special interest for the comparative study of the Defoid languages.

4.1.2.3 Edoid

The following reconstruction is based on nearly forty sources which represent twenty languages within this group. The reconstruction proposed by Elugbe was also considered.

Being no specialist in the comparative study of the Edoid languages (unlike Elugbe), I do not feel competent enough to criticize his ideas. Elugbe likely had his reasons for reconstructing the same consonant (*ch-) in the terms for ‘three’, ‘five’, ‘six’, and ‘seven’. Indeed, the comparison of data from the four Edoid branches confirms that the terms for ‘three’ and ‘five’ (but not for ‘seven’) have the same initial consonant. This is common for many of the NC branches (and probably for the Proto-NC as well).

In view of this, I would like to suggest a simplified reconstruction that is closer, in my opinion, to the actually attested forms (Table 4.31).

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Table 4.31: Edoid numeral systems and Proto-Edoid

	1. Delta	2. North-Central	3. North-western	4. South-western	Proto-Edoid (Elugbe)	*Proto-Edoid
1	βɔ	kpa, wo/gwo	kpa	vɔ		kpa, wo/gwo/vu
2	βə/βa	va	va	vɛ	i-və	va/və
3	saa	sa	sa	sa	u-chaGi	sa
4	ni	ne	ni	ni	niə	ni
5	súwón/ syòni	sen/fen	sie	soi/siorin/ jorin	ii- chiNənhi	sien/ su(w)on
6	3PL	3+3?	3+3	3PL?	chaN	3PL, 3+3
7	5+2	hiron/hilon, 5+2	sie/hi/rhi	ɣwré/hre	i-chiə	ghie?
8	4PL, 4 redupl	renren/ lelen	nien	re(r)e	nhuNanhu	4 redupl.
9	10-1	sin(rin), tili	5+4	rhi(r)i, zi	i-ciənhi	cien/sin
10	gbeny/gbei	gbe	gbe	kpe/xwe	gbeNi	gbe, kpe
20	jow/yei	gie/je	gboro, ghe/ze/ye	dhe/ʒè/ʒè	u-gheGi ~ u-ʒh	gie/jie
100	20*5	20*5	10PL	20*5		20*5
1000		ria/li, gbele	500*2	du, riorin		du, ria/li

4.1.2.4 Idomoid

The roots attested in about ten of the Idomoid languages are represented in Table 4.32.

Table 4.32: Idomoid numerals

1	nze/je/nye/ye, kpokpoh? ^a	7	5+2, renyi
2	pa, miyeh?	8	5+3
3	ta/la	9	5+4
4	nè, ndo, he	10	gwo/wo, jwo
5	do/lo, ho, ro/rwo	20	fu/hu, su
6	rowo/riwi, ji, hili	100	20*5, 10*10

^aPlease note that hypothetically related forms are separated by a slash (/), whereas unrelated ones are separated by a comma.

It should be noted that the data on the Yatye-Akpa branch (one of the two Idomoid branches) is systematically absent. The analysis is based on the Akweya languages only, so unexpected issues may arise.

4.1.2.5 Igboid

This is a small group consisting of several languages. The forms which could be found in modern Igboid languages are listed in Table 4.33.

Table 4.33: Igboid numerals

1	tù, òìné (Ekpeye)?	7	saà
2	bó	8	5+3
3	tó	9	totu/tolu
4	nó	10	dî/ri/li
5	sé	20	gw ^h ô/γ ^h ô, kpɔrɔ
6	ʃí	100	20*5
		1000	puk(w)u

Interestingly, the terms for ‘one’ attested in the Igboid languages (as found in Koelle 1963[1854]) are subject to significant variation. The following forms are noteworthy: ‘1’ – Ísóāma *oo-te*, Íʃiēle *mfiu*, Ábādʃa *na*, Aro *mbɔ*, Mbófia *mpon* (the transcription of the forms and languages follows Koelle). The rest of the numerals quoted by Koelle are essentially the same as the ones found in Table 4.34.

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4.1.2.6 Jukunoid

Table 4.34: Jukunoid numerals

	1. Bete (Juk.)	2. Central	3. Yukuben-Kuteb	Proto-Jukunoid
1	ʃíʃe	(d)zun/(d)zuŋ	nzo, jiʔ, yɔnʔ, ŋgēméʔ, tónʔ	*d)zunʔ ʃíʃeʔ tónʔ
2	há	pye(na)	pa(n)/fa(n)	*pa(n)/fa(n)
3	tà	(t)sara	ta	*ta
4	ɲè	nye(na)	ɲi, nje/nzi	*nye
5	tsòŋ	(t)swa(na)	t(s)oŋ	*tsoŋ
6	5+1	5+1	5+1	*5+1
7	5+2	5+2	5+2	*5+2
8	5+3	4 redupl., 5+3	5+3	*4 redupl., 5+3
9	5+4	5+4?	5+4	*5+4
10	wo	dub (<Hausa?), dz(w)e	kurʔ kuwub, bji/bzi, jwēr	*jwe, woʔ kurʔ
20	?	'body' (á-dì)	kam/k(w)om	*'body' (di)
100	?	20*5	20*5, Hausa	*20*5
1000	?	<Hausa	Hausa	<Hausa

Tentative reconstructions for the three major branches of this relatively small family are presented in the table above. The terms for 'one' and 'ten' vary significantly.

4.1.2.7 Kainji

The comparative analysis of the Kainji group is hindered by the fact that there is no linguistic description for the majority of its languages. However, there is a great range in numerical terms within those languages, for which reliable data is available. The following analysis is based on thirty pertinent sources, including the comparative list of forms compiled by Dettweiler & Dettweiler (1993). What follows is a step-by-step analysis of the available data that will hopefully yield some answers.

4.1.2.7.1 'One'

Table 4.35: Kainji stems for '1'

Language		'1'	'1'	'1'	'1'
Eastern					
Jera	Iguta			dínkā	
Jera	Janji			dínkɛ	mde
Jera	Bunu		ù-ṅṅíni	dínkà	
Jera	Buji			dínkà	
Amo	Amo			*lu-run	
Western					
Basa	Basa	hīn			
Duka	C'lela	tʃí			
Duka	Hun-Saare(Duka)	cɔɔn			
Duka	Ut-Ma'in	tʃɔ:n			
Duka	Rijau	tʃoon			
Duka	Darangi	tʃoor			
Duka	Bunu	dii			
Duka	Iri	dən			
Duka	Dukku	dɛn			
Duka	Giro	diiin			
Kambari	Tsishingini (Kambari)		íyyán		
Kambari	Agaushi (Tsikimba)				'-tè
Kambari	Kambali (Koelle)		íjpa		
Kamuku	Western Acipa (Cicipu)				tô:
Kamuku	Kamuku (dial.)		ĩjá		
Kamuku	Hungworo (Hungwere)		ĩ:jǎ		
Kamuku	Pongu (Pangu)	hĩ:			
Kamuku	Kamuku (Koelle)	hĩja			
Kamuku	Fungwa	hĩ			
Reshe	Reshe (Tureshe)	tsúnnè			

The grouping principles for the forms included in this table are admittedly haphazard. On the one hand, the relationship between some of the forms arranged into the same column (e.g. *hīn*, *tʃɔ:n* and *dɛn* or *dínkā* and **lu-run*) is not immedi-

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ately apparent. On the other hand, some of the forms placed in separate columns might be etymologically related (e.g. *diiin* Giro and *dinkā* Iguta). In these circumstances it seems reasonable to go back to the reconstruction of the Kainji term for ‘one’ on the basis of the data provided by other Benue-Congo branches (see §4.1.4).

4.1.2.7.2 ‘Two’

The above considerations regarding the term for ‘one’ are applicable to the term for ‘two’ as well. The inventory of forms found in Table 4.36 is neither helpful

Table 4.36: Kainji stems for ‘2’

		‘2’	‘2’	‘2’	‘2’
Eastern					
Jera	Iguta			rè:pú	
Jera	Janji		ti-rɛ (-wa--a-)	-rèpó	
Jera	Bunu				
Jera	Buji			rèpó	
Amo	Amo				im-ba
Western					
Basa	Basa	jèbí (yééwi)			
Duka	C’lela		ʔíí		
Duka	Hun-Saare(Duka)		yoor		
Duka	Ut-Ma’in		jɔːr		
Duka	Rijau		joor		
Duka	Darangi		joor		
Duka	Bunu		jɔːr		
Duka	Iri		joor		
Duka	Dukku		juur		
Duka	Giro		joor		
Kambari	Tsishingini (Kambari)		ì-rè		
Kambari	Agaushi (Tsikimba)		-rè		
Kambari	Kambali (Koelle)		íí-ɛ		
Kamuku	Western Acipa (Cicipu)	jápù			
Kamuku	Kamuku (dial.)	ⁿ dɔ́wà			
Kamuku	Hungworo (Hungwere)		ʔíḽ-dʒà		
Kamuku	Pongu (Pangu)		rè:nù		
Kamuku	Kamuku (Koelle)				wúúlee
Kamuku	Fungwa	jó:gó			
Reshe	Reshe (Tsureshe)				rìsḽ

for the reconstruction of the Proto-Kainji term for ‘two’, nor suggestive of the morphemic analysis of the pertinent forms within each of the branches. As we hope to demonstrate below, additional information that may prove useful for the reconstruction of the term for ‘two’ can be obtained through the analysis of the term for ‘seven’.

4.1.2.7.3 ‘Three’, ‘Four’ and ‘Five’

Table 4.37: Kainji stems for ‘3’-‘5’

		‘3’	‘4’	‘5’	‘5’
Eastern					
Jera	Iguta	tààrū	nà:nzī		ʃù:bi
Jera	Janji		tɪ-naze		ʃibi
Jera	Bunu		nà:zé		ʃi:bi
Jera	Buji		nàzé		ʃíbi
Amo	Amo		nnas	n-ntaun	
Western					
Basa	Basa	tàtɔ	néʃi (nááʃii)	táná	
Duka	C’lela	tí:ʃù	ná:sé	tá	
Duka	Hun-Saare(Duka)	tett	náss	táán	
Duka	Ut-Ma’in	tšt	ná:s	tán	
Duka	Rijau	tɪ ^h	nəss	taan	
Duka	Darangi	tɪ ^h	nas	taan	
Duka	Bunu	tɪ ^h	nas	tan	
Duka	Iri	tɪrt	nass	taan	
Duka	Dukku	tiit	nas	taan	
Duka	Giro	tɪ ^h	nass	taan	
Kambari	Tsishingini (Kambari)	tàʔàtsú	nó ^ʔ ʃín	tá: ^ʔ wún	
Kambari	Agaushi (Tsikimba)		‘-nəʃi	‘-táú	
Kambari	Kambali (Koelle)	tááatsu	nóʃín	tááu	
Kamuku	Western Acipa (Cicipu)	tá:tù	nósi	táú	
Kamuku	Kamuku (dial.)	tátò	nəʃi	tóú	
Kamuku	Hungworo (Hungwere)	táʔò	ùnəʃĩ	sátá	
Kamuku	Pongu (Pangu)	tá:tù	ně:ʃĩ	tá	
Kamuku	Kamuku (Koelle)	tááto	náʃii	taa ~ tááa	
Kamuku	Fungwa		nó:ʃi	tá	
Reshe	Reshe (Tsureshe)	tàtswā	nāʃě	tš	

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Unlike the terms for ‘one’ and ‘two’, the numerals covering the sequence from ‘three’ to ‘five’ are quite homogeneous and thus can be reliably reconstructed (just as in the majority of other NC branches). The provisional forms suggested for ‘three’, ‘four’, and ‘five’ are **tat*, **nas*, and **tan* respectively. The latter form can also be reconstructed for Eastern Kainji on the basis of the Amo evidence. Thus *fibi* (*fɪ-bi*?) ‘five’ is an innovation of the Jera subgroup.

4.1.2.7.4 ‘Six’ and ‘Seven’

Table 4.38: Kainji stems and patterns for ‘6’-‘7’

			‘1’	‘2’	‘5’	‘6’	‘7’	‘7’
Eastern								
1	Jera	Iguta				twà:sì		súnà:rì
2	Jera	Janji		ti-rɛ		tase		sunare
3	Jera	Bunu				tá:sè ~tá:sé		súnà:ré
4	Jera	Buji				tásé		súnàrì
5	Amo	Amo			n-ntaun	ku-tofɪn	kuzor	
Western								
6	Basa	Basa	hìn		táná	tʃihin		tʃéndzɛ
7	Duka	C’lela	tʃí	*ʔi-lì	tá	tʃihí		táʔíí
8	Duka	Hun-Saare	coon	*yoo-r	táán	cind		tá’yoor
9	Duka	Ut-Ma’in	tʃɔ:n	*jɔ:-r	tán	ʃɪɪn		tàʔèr
10	Duka	Rijau	tʃoon	*joo-r	taan	tʃiin		ta’joor
11	Duka	Darangi	tʃoor	*joo-r	taan	tʃin		taŋ’jor
12	Duka	Bunu	dii	*joo-r	tan	tʃiin		ta’juu
13	Duka	Iri	dən	*joo-r	taan	tʃinnd		ta’joor
14	Duka	Dukku	dən	*juu-r	taan	tʃinɟ		ta’jaar
15	Duka	Giro	diin	*joo-r	taan	tʃind		ta’joor
16	Kambari	Tsishingini		i-rè	tá:wún	tà:lí		tʃindèrɛ
17	Kambari	Agaushi	-tè	-rè	-táú	-tè:lí		tʃindèrè
18	Kambari	Kambali		íí-le, *rɛ	tááú	tóólí		tsindeɛrɛ
19	Kamuku	West.Acipa		*jà	táú	tóríhí		tíndàjà
20	Kamuku	Cinda		*ɸə	tóú	tánóhí		téndəɸə
21	Kamuku	Hungworo		ʔá-dzə, *rʔ	sátá	ũ-túnihí		ũ-tándàrʔ
22	Kamuku	Pongu	hí:	rè:nù, *rə	tá	tʃiníhí		téndə̀rè
23	Kamuku	Kamuku	hí:á	*lee	taa ~ tááa	túnui		tandálee
25	Kamuku	Fungwa	hí	*lò	tá	tʃihí		tíndàlò
25	Reshe	Reshe	tsúnnè		tá	tēnzō		tànsǎ

Some of the previously discussed terms for ‘one’, ‘two’ and ‘five’ are quoted in the table above alongside the terms for ‘six’ and ‘seven’. Such grouping might facilitate a better understanding of compound numerals (if ‘six’ and ‘seven’ are indeed compounds) as well as the methodological and theoretical aspects behind their reconstruction. In addition, it might help to establish whether parts of compound numerals can be used to enhance the reconstruction of the primary numerical terms such as ‘one’, ‘two’, and ‘five’.

The compound nature of the term for ‘seven’ is betrayed by its ‘length’: the forms quoted in the table normally have two to three syllables, whereas the primary numerals are as a rule mono- or (rarely) bisyllabic.

At the same time, in some of the cases the pattern ‘7=5+2’ is immediately apparent (cf. languages 7–11, 13–15).

At this point, however, we will deal with those languages that show only faint (or no) traces of the pattern in question (‘7=5+2’). E.g. in Tsishingini (16) we have to assume the pattern ‘7=X+2’, where ‘X’ is an unknown element, whereas in language 12 the pattern is ‘7=5+X’ (the relationship between ‘X’ and the term for ‘two’ is questionable).

Let us assume that the Proto-Kainji terms for ‘two’ and ‘five’ are *CL-re (cf. e.g. Duka **jo-re* > *joor*) and **tan* respectively. In this case, the compound term for ‘seven’ would be **tan*-(CL)-re or **tan*-X (connector)-(CL)-re. The most typical diachronic scenarios for the emergence of the ‘X’-patterns effective on the synchronic level are as follows:

1. Both basic elements of the compound ‘seven’ (i.e. reflexes of the terms for ‘two’ and ‘five’) are preserved in the language, as is the compound itself (sometimes slightly modified in accordance with the relevant phonotactic rules). Cf. e.g. the Darangi (11) evidence: **jo-re* > *joor* ‘2’, **tan* > *taan* ‘5’, **taan-jo-re* > *taŋ’jor* ‘7’. In this case, the reconstruction comes down to the simple statement that in the Darangi language ‘7=5+2’.
2. The compound ‘seven’ (even if slightly modified) is preserved in the language, while the term for ‘two’ is replaced with an innovation. Let us assume that in the Basa language (6) *jèbí* (Koelle: *yééwi*) ‘2’ < **jo-bi* (innovation), *táná* ‘5’ (the reflex of **tan*), *tʃéndze* < **tan-re* ‘7’. In this case, **tan-re* > *tan-dze* > *tendze* (regressive assimilation) > *tʃendze* (palatalization before the front vowel). Hypothetical as it may be, this example is phonetically plausible.

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Any of these model processes may result in the loss of phonetic resemblance between a derived form and its source. This may lead to a situation where a derivation pattern is no longer recognizable by speakers. As a consequence, the term for ‘seven’ becomes opaque on the synchronic level and can no longer be analysed as ‘5+2’.

This means that the replacement of the original term for ‘two’ by an innovation does not affect the compound term for ‘seven’, i.e. that its second part is not automatically replaced. Moreover, in case there is sufficient evidence that the second of the aforementioned scenarios was applied, we may enhance the reconstruction of the primary term for ‘two’ on the basis of the compound term for ‘seven’. E.g. the form *tféndze* suggests that the original Basa root for ‘two’ was **dze / re* and not **bi* as in the majority of the Kainji languages.

The available pertinent forms point toward the reconstruction of the Proto-Kainji form as **tan-da-re* (‘5’-connector-‘2’). The reconstructed forms for ‘two’ (marked with [*] in Table 4.38) suggest a Proto-Kainji form **re* ‘2’ and the pattern **’7=5+2’*. The Eastern Kainji forms for ‘seven’ are probably innovations.

However, some of the forms attested for ‘seven’ may point toward the reconstruction of ‘two’ as **ba/bi* in Proto-Kainji. In this case our reference list should be expanded by adding dialects that were not included for reasons of space: it is not possible to quote every single NC source every time. E.g. Cawai (Eastern Kainji) *a-ba* ‘2’, *a-tar-ba* ‘7’, Ngwoi (Hungworo) *e-bia* ‘2’, *sa-bia* ‘7’ (the root **ba/bi* is also suggested by Eastern: Gure *pi-ba*, Gyem *ve*, Piti *ba*, Surubu *ka-va*).

The forms for ‘six’ are more problematic since they may go back to a primary root (or roots). They may be tentatively reconstructed as **ci(hi)n*, **tas*, and **tel*. We will come back to these forms in order to enhance their reconstruction in case similar forms are detected in other BC branches.

4.1.2.7.5 ‘Eight’

The Eastern Kainji and Duka forms (if related) suggest that the primary root **-ru* should be reconstructed for ‘eight’ in Proto-Kainji. At this point, let us reserve a preliminary form **u-ro/ ji-ru* for further comparison. In most of the Kamuku languages the pattern ‘8=5+3’ is traceable (but note the Western Acipa form that is comparable to those attested in Kambari and possibly Amo (Eastern)). This points towards an alternative form of uncertain morphological structure (**kunle(v)/ kunlo* ‘8’).

Table 4.39: Kainji stems and patterns for ‘8’

		‘8’	‘8’	‘8’
Eastern				
Jera	Iguta	ùrū		
Jera	Janji	uro		
Jera	Bunu	ùrú		
Jera	Buji	úrú		
Amo	Amo			kuliv
Western				
Basa	Basa		tɔndatɔ (5+3)	
Duka	C’lela	jé:rù		
Duka	Hun-Saare(Duka)	yéér		
Duka	Ut-Ma’in	é:r		
Duka	Rijau	eer		
Duka	Darangi	er		
Duka	Bunu	εεr		
Duka	Iri	πr		
Duka	Dukku	εεr		
Duka	Giro	εεr		
Kambari	Tsishingini (Kambari)			kùnlà
Kambari	Agaushi (Tsikimba)			kúnlài
Kambari	Kambali (Koelle)			kúnlo
Kamuku	Western Acipa (Cicipu)			kùrìl:ò
Kamuku	Kamuku (dial.)		tántátò (5+3)	
Kamuku	Hungworo (Hungwere)		ū-tátàṭò (5+3)	
Kamuku	Pongu (Pangu)		ṭénda:tù (5+3)	
Kamuku	Kamuku (Koelle)		túndaat (5+3)	
Kamuku	Fungwa		tíndátù (5+3)	
Reshe	Reshe (Tureshe)		dálànzò	

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4.1.2.7.6 ‘Nine’ and ‘Ten’

There are several forms and patterns for ‘nine’ whose reconstruction is equally plausible: ‘9=5+4’, **tor(b)oj* (possibly < *’10-1’), **jiro*. Each of the forms/patterns is characteristic of a particular sub-group of languages. The term for ‘ten’ is reconstructed as **pwa*, with its reflexes attested in all Western Kainji branches. Three alternative forms (**turu*, **kuri*, **kup/kpa*) are found in Eastern Kainji, where they are employed for counting and in quantity measures.

4.1.2.7.7 ‘Twenty’ and ‘Hundred’

The diversity of patterns for ‘hundred’ may indicate the absence of the term in Proto-Kainji. The term for ‘twenty’ likely followed the pattern ‘20=10*2’. However, the form **jin/fik* attested in three of the Western Kainji branches is noteworthy.

4.1.2.7.8 Summary

It should be noted that a full reconstruction of the Kainji numeral system is not presently achievable for a number of reasons: some of the forms have multiple alternative variants, many terms are not attested outside Kainji (or have an obscure morphological structure), the elements of the compound terms are not always identifiable (e.g. in the patterns ‘7=X+2’ or ‘7=5+X’), etc.

The numerals attested within this group are so peculiar (at least for a non-specialist in the Kainji languages like myself) that one may wonder whether the Kainji group should indeed be treated as a branch of Benue-Congo. In any case, it seems reasonable to record all the forms reconstructable within the Kainji sub-groups. These forms and patterns are represented in the table below (Table 4.40).

Table 4.40: Kainji summarized data for BC reconstruction

1	* <i>tsin</i> , <i>hin</i> , <i>din</i> , <i>jan/yan</i> , * <i>te</i> ...	7	*5+2
2	* <i>re</i> , * <i>ba/bi</i> , - <i>pu</i> ?	8	* <i>ro/ru</i> , *5+3, * <i>kunle(v)/kunlo</i>
3	* <i>tat</i>	9	*5+4, *10-1, * <i>jiro</i>
4	* <i>nas</i>	10	* <i>pwa</i> , * <i>turu</i> , * <i>kuri</i> , * <i>kup/kpa</i>
5	* <i>tan</i>	20	*10*2, * <i>jin/fik</i>
6	* <i>ci(hi)n</i> , * <i>tas</i> (<3?), * <i>tel</i>	100	?

Table 4.41: Kainji stems and patterns for ‘9’ and ‘10’

		‘9’	‘9’	‘9’	‘10’	‘10’
Eastern						
Jera	Iguta		tòrbò (10-1)		bū-tú:rú	
Jera	Janji		toroəi (10-1)		turo, kɪrəu	
Jera	Bunu		tò:rêj (10-1)		bì-tú:rú; rú-kúrí	
Jera	Buji		toroj (10-1)		bì-túrú; rì-kùrì	
Amo	Amo		ku-tivi		ku-lidir *li-kure	
Western						
Basa	Basa	tʃíndzjɪ (5+4)			uɪpɰá	
Duka	C’lela			dó:rè	ʔó:pá	
Duka	Hun- Saare(Duka)			jírò	ɔpp	
Duka	Ut-Ma’in			dʒ ^w ɛ:r	ɔp	
Duka	Rijau			dʒírɔ	ɔp ^h	
Duka	Darangi			dʒírɔ	’ɔp ^h	
Duka	Bunu			dʒírɔ	ɔp ^h	
Duka	Iri			dʒírɔ	ɔp ^h	
Duka	Dukku			dʒírɔ	ɔp ^h	
Duka	Giro			dʒedɔ	ɔp	
Kambari	Tsishingini (Kambari)	kùttɪ			kùppá	
Kambari	Agaushi (Tsikimba)	kùtɪ			kùpá	
Kambari	Kambali (Koelle)	kúciici			hókpa	
Kamuku	Western Acipa (Cicipu)	kùtítí (5+4)			ùkúpà	
Kamuku	Kamuku (dial.)	téndáɸi (5+4)			òpá	
Kamuku	Hungworo (Hungwere)	ùtánə̀sī (5+4)			ìkóp’è	
Kamuku	Pongu (Pangu)	tṹndúɸi (5+4)			úpɰá	
Kamuku	Kamuku (Koelle)	tándaafii (5+4)			ópaa	
Kamuku	Fungwa	tíndíɸi (5+4)			úpá	
Reshe	Reshe (Tsureshe)	tānā́ǰé (5+4)			úpɰá	

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Table 4.42: Kainji stems and patterns for ‘20’ and ‘100’

		‘20’	‘20’	‘20’	‘100’
Eastern					
Jera	Iguta			12+8	12*8+4
Jera	Janji				
Jera	Bunu				rì:mú
Jera	Buji			10*2	*ri-nu
Amo	Amo			akut-2	li-kalt
Western					
Basa	Basa	wéfi (K:wóófi)			dupu íjèbi (50*2)
Duka	C’lela	d ^w k ^w èzè			k ^w èfjǎ/vzínǵù
Duka	Hun-Saare(Duka)	ɛr-kwooz			kwooz-ɛt táán (20 * 4), o-zùngu
Duka	Ut-Ma’in		ɛrǵik		ɛʔfíkɛʔtán (20 * 5)
Duka	Rijau				
Duka	Darangi				
Duka	Bunu				
Duka	Iri				
Duka	Dukku				
Duka	Giro				
Kambari	Tsishingini (Kambari)		ú:fín		?
Kambari	Agaushi (Tsikimba)			kà-màngà	
Kambari	Kambali (Koelle)		úfí		
Kamuku	Western Acipa (Cicipu)			10*2	10*10, mándá
Kamuku	Kamuku (dial.)			10*2	d̀̀rí (<Hausa) or d̀̀è òpá
Kamuku	Hungworo (Hungwere)			10*2	ihǵng ^w à, 10*10
Kamuku	Pongu (Pangu)	wéfi			bijǵnǵ
Kamuku	Kamuku (Koelle)			10*2	
Kamuku	Fungwa		kùdǵjò		ikwà:ku, <Hausa
Reshe	Reshe (Tsureshe)			ál̀̀s̀̀	ránǵkù

4.1.2.8 Platoid

4.1.2.8.1 ‘One’ (Table 4.43)

The grouping of roots here is admittedly provisional, because their morphological structure is often obscure. In addition, phonetic changes that may have taken place are unknown. It is very difficult to propose any etymological interpretation for the forms represented in the table. Which of them could be attributed to the Proto-Platoid is unclear (**(y)in* represents a possibility, in case noun class markers are indeed incorporated into the numerical terms).

Table 4.43: Platoid stems for ‘1’

1.	Alumu-Tesu	Tesu			à-nyimbere
2.	Ayu	Ayu	r-dɪ		
3.	Bioromic	Biorom		gw-ìniŋ/(d)-ìniŋ	
3.	Bioromic	Eten	dáy		
4.	Cenral	Izere		z-ìniŋ	
4.	Cenral	Irigwe			ʔzrú
4.	Cenral	Kaje (dial.)			yiruŋ/yirəŋ
4.	Cenral	Tyap			a-nyuŋ
5.	Hyamic	Hyam		ʒ-ìni	
6.	Ninzic	Mada		*nen	gyə̀r
6.	Ninzic	Ninzo		*ni	jír
7.	Northern	Ikulu			ínjí
8.	Southeastern	Fyam		kʰ-éŋ, *in	
9.	Southern	Lijili	lɔ̃		
10.	Taroid	Tarok (dial.)			ù-zìŋ, *dʰíŋ?
11.	Western	Yeskwa (dial.)			è-nyí
11.	Western	Rukuba (dial.)		gy-ín	
11.	Western	Eggon (dial.)			á-kián
11.	Western	Eggon (dial.)	ò-rí		
11.	Western	Hasha		nʷ-ināŋ	
?	Sambe		n-ínínā		

Tesu data are taken from Blench & Kato 2012.

4.1.2.8.2 ‘Two’, ‘Three’ and ‘Four’ (Table 4.44)

The roots for ‘two’ containing voiced and voiceless labials are attested in the Platoid languages (as well as in some other BC branches). They may be tentatively reconstructed as **pa/ fa/ ha* and **ba/ wa*.

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Table 4.44: Platoid stems for ‘2’, ‘3’ and ‘4’

			‘2’	‘2’	‘3’	‘4’
1.	Alumu-Tesu	Tesu		à-hùrwi	à-taato	a-ane
2.	Ayu	Ayu	ahwa/afah		a-taar	a-nanɔf
3.	Biromic	Birom		-bā	-tāt	-nā:s
3.	Biromic	Eten	fà		tāt/tfāt	nā:s
4.	Cenral	Izere	fà		taar	nààs
4.	Cenral	Irigwe		ʔmʲè	ʔtsʲè	ʔni
4.	Cenral	Kaje (dial.)	ʔ-hwa		ʔ-tat	-nai
4.	Cenral	Tyap	a-feaŋ		a-tat	a-naai
5.	Hyamic	Hyam	f _{eri} , *fo		taat	naaŋ
6.	Ninzic	Mada		y-wā, *gba	tar	nlyē
6.	Ninzic	Ninzo	há	*gba	tár	nō(s)
7.	Northern	Ikulu	ín-pààlá		ín-táá	ín-nāā
8.	Southeastern	Fyam	por		táár	naas
9.	Southern	Lijili		à-bē	à-tfē	à-nàrɔ
10.	Taroid	Tarok (dial.)	ù-pàríim		ù-fáđíŋ	ù-nèđíŋ
11.	Western	Yeskwa (dial.)		èn-và	èn-tāt	èn-nà
11.	Western	Rukuba (dial.)	ʔ-hàk		-tāt	-nàs
11.	Western	Eggon (dial.)	à-hàà		à-tráá	ù-ɲí
11.	Western	Eggon (dial.)	ò-hà		ò-cá	ò-ɲì
11.	Western	Hasha	à-p ^w ò		ā-tāt	à-nìŋ
?	Sambe	bèkà-fà	kà-tú	kà- tār/béká- tār	kà- nè/bèkà- nè	

The roots for ‘three’ and ‘four’ are more stable. Some of their reflexes suggest that the Proto-Platoid forms must have been close to the NC forms: *tat ‘3’ and *nai / *nas ‘4’.

4.1.2.8.3 ‘Five’ and ‘Six’ (Table 4.45)

Table 4.45: Platoid stems and patterns for ‘5’ and ‘6’

			‘5’	‘5’	‘6’	‘6’
1.	Alumu-Tesu	Tesu	a-túŋgú		térékífi (<3?)	
2.	Ayu	Ayu	a-tugen		a-teer (3PL)	
3.	Biromic	Birom	-tūjūn			-tī:mìn
3.	Biromic	Eten		wí	tà:rà (<3)	
4.	Cenral	Izere	tùwùn		ìgà-rà:r (3PL)	
4.	Cenral	Irigwe	ʔteʷòò		rí-tsʰé (3PL)	
4.	Cenral	Kaje (dial.)		-pʷwɔn	kə-tat (3PL)	
4.	Cenral	Tyap		a-fwuon	a-taa (3PL)	
5.	Hyamic	Hyam	twoo		twaa-ni (5+1)	
6.	Ninzic	Mada	tun		tān-nèn (5+1)	
6.	Ninzic	Ninzo	tʰí		tā-nì (5+1)	
7.	Northern	Ikulu	ín-cūū		ín-cúnú (5+1?)	
8.	Southeastern	Fyam	tóón		táár-in (5+1)	
9.	Southern	Lijili	à-sq̄		mìn-zí (3PL?)	
10.	Taroid	Tarok (dial.)	ù-túkún		ù-kpá-díŋ (X+1?)	
11.	Western	Yeskwa (dial.)	èn-tyúò		èn-cí (5+1)	
11.	Western	Rukuba (dial.)	-túj		tàìj	
11.	Western	Eggon (dial.)	ò-tnó	*fúújɲ	ù-fín (5+1?)	
11.	Western	Eggon (dial.)	ò-tnô	*fɔ̄jɲ	à-fí(5+1?)	
11.	Western	Hasha	ā-tūkūn			à-kʷip
?	Sambe	kà-tūn			kù-hò/dògò-hò	

The term for ‘five’ is reconstructed as **tu(ku)n*. It is likely that there was no primary term for ‘six’ in the Proto-Platoid group: in all pertinent languages (except for Eggon, Hasha and Sambe) the term in question either follows the pattern ‘5+1’ or is built by adding a plural class to the term for ‘three’.

4.1.2.8.4 ‘Seven’ and ‘eight’ (Table 4.46)

Word-building patterns for the term for ‘seven’ are normally quite transparent: ‘7=5+2’ is attested in the majority of the sub-groups, whereas ‘7=4+3’ is more rare. The same can be applied to the term for ‘eight’, which either follows the pattern ‘8=5+3’ or is built by partial reduplication of ‘four’ (4 redupl.). Sometimes the archaic primary terms for ‘two’ and ‘five’ are traceable in the forms for ‘seven’ and ‘eight’ (such forms are marked with an asterisk in the respective tables).

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Table 4.46: Platoid stems and patterns for ‘7’ and ‘8’

			‘7’	‘8’	‘8’
1.	Alumu-Tesu	Tesu	térékífi napí (6+X)		tsyátsyá
2.	Ayu	Ayu	a-taraŋaf (3+4)	a-na-ba-bog (4+X)	
3.	Biromic	Birom	-tā:mà (5+2)		-rwīt
3.	Biromic	Eten	nìtā (4+3)	nàràs (4+X)	
4.	Cenral	Izere	kà-nàsàtáár (4+3)		ì-kárá
4.	Cenral	Irigwe	nats ^l é (4+3)		klaŋvā
4.	Cenral	Kaje (dial.)	ti:ruŋ (cf. yiruŋ ‘1’)	nai-mōwak (4+X)	
4.	Cenral	Tyap	a-natat (4+3)	a-ninai (4 redupl.)	
5.	Hyamic	Hyam	twarfo (5+2)?	naaraŋ (4+X)	
6.	Ninzic	Mada	tāngbā (5+2)	tāndā (5+3)	
6.	Ninzic	Ninzo	tāngbā (5+2)	tāndār (5+3)	
7.	Northern	Ikulu	tóòpāā (5+2)	nínñāā (4 redupl.)	
8.	Southeastern	Fyam	támor (5+2)		tʃínít
9.	Southern	Lijili	mú-tá		rúnó
10.	Taroid	Tarok (dial.)	ù-fāŋ-ǰát (X+3)	ù-nènnè (4 redupl.)	
11.	Western	Yeskwa (dial.)	tònvà (5+2)	tóndát (5+3)	
11.	Western	Rukuba (dial.)	taŋbák (5+2)	ta:rat (5+3)	
11.	Western	Eggon (dial.)	à-fóhà (5+2)	à-fóté (5+3)	
11.	Western	Eggon (dial.)	à-fóhà (5+2)	à-fóté (5+3)	
11.	Western	Hasha	à-k ^w ip n ^y ināŋ (cf. 6, 4)	nàniŋ (4 redupl.)	
?	Sambe	kōrōnkérā/kúrkōnrā		ī-tór	

4.1.2.8.5 ‘Nine’ and ‘Ten’ (Table 4.47)

It is likely that the term for ‘nine’ attested in Ikulu, Yeskwa and Sambe (*toro/cora*) is primary. The hypothetical inter-relationship of these roots may be of interest for the Proto-Platoid reconstruction, because these languages do not belong to the same sub-group. The forms of ‘nine’ in the majority of the languages show traces of ‘five’, ‘four’, ‘ten’ and ‘one’, which suggests that two alternative patterns (‘9=5+4’ or ‘9=10-1’) could have been in use. Some rare patterns (e.g. ‘9=12-3’ (Biom) and ‘9=8+X (Tesu)) are of interest for the linguistic typology.

According to Bouquiaux (1962) the term for ‘twelve’ (*kūrū*) is attested in Biom. In this language ‘21’ (*kūrū ná syā:-tāt*) = ‘12+9’ (*syā:-tāt*), while ‘80’ (*bākūrū bātī:mìn ná rwī:t*) = ‘12*6’ (*-tī:mìn*) + ‘8’ (*-rwī:t*). The pattern ‘9=12-3’ is not totally unexpected within this context. A similar system can be traced in the Mada language. As stated in our source (Abiel Barau Kato), “Like many languages in Platoid area, Mada has an old duodecimal numeral system up to 24.”¹⁰ The Mada terms for ‘twelve’ and ‘twenty-one’ are *tsɔ* and *tsɔtīyār* (*tīyār* ‘9’) respectively. The same root for ‘twelve’ (*tsó* ‘12’) is found in Ninzo for which our source notes that “In the traditional counting system, to count beyond twelve (12), that is from thirteen onwards, entails counting in sets of twelve.”¹¹ Moreover, the same root is attested in Tesu (*tsɔ* ‘12’). According to Uche Aaron, a primary root *ɔ-c* ‘12’ is discernible in Eggon (beside the composite term ‘12=10+2’). This root is also found in Rukuba (Che) in *u-sók* ‘12’. The duodecimal numeral system as attested in this language is of the utmost sophistication. According to Luc Bouquiaux: “There are two words for number ‘72’, *kitu* and *atu*, 144 can be expressed as *atu ahak* and 200 is *atu ahak ni isok inas ni hak ni tarat* ($72 * 2$) + $(12 * 4) + 8$.”¹² Other languages in this group normally use less exotic systems. In some of them, however, e.g. in Eten, “The highest number that can be counted in traditional way is 144,”¹³ i.e. ‘12*12’. To sum up, it seems that a primary term for ‘twelve’ can be reconstructed on the Proto-Platoid level, hence the pattern for ‘nine’ should most probably be reconstructed as *‘9=12-3’.

The system outlined above adds a new perspective to the forms with the meaning ‘ten’. Presumably, there was a Proto-Platoid primary term for ‘ten’ that may be tentatively described as **kop*. The alternative forms *sok/swak* may be etymologically related to the forms for ‘twelve’ cited above. If so, their change of meaning may have resulted from the adoption of a decimal system. The root *gur/wur* is distinguished as well.

¹⁰<https://mpi-lingweb.shh.mpg.de/numeral/Ninzo.htm>

¹¹<https://mpi-lingweb.shh.mpg.de/numeral/Ninzo.htm>

¹²<https://mpi-lingweb.shh.mpg.de/numeral/Rukuba.htm>

¹³<https://mpi-lingweb.shh.mpg.de/numeral/Aten.htm>

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Table 4.47: Platoid stems and patterns for ‘9’ and ‘10’

			‘9’	‘9’	‘10’	‘10’	‘10’
1.	Alumu-Tesu	Tesu	tšyátsyá nají (8+X)				gòròmàvo
2.	Ayu	Ayu	a-tu-lu-bog (5+4?)			i-fog/ a-ja-la-bog	
3.	Biromic	Birom	syā-tāt (12- 3)				12-2
3.	Biromic	Eten	dù:džàŋ (10-X)				dù:bò
4.	Cenral	Izere	kátúbók (5+X?)			kù-sók	
4.	Cenral	Irigwe		kruvájá		ʃwá	
4.	Cenral	Kaje (dial.)	kuməwi:ruŋ (10-1?)		*ku?	swak	
4.	Cenral	Tyap	akubunyuy (10-1?)		*kub?	swak	
5.	Hyamic	Hyam	mbwan kɔb (10-1)		kɔb		
6.	Ninzic	Mada	tīyār (X-1?)				gùr
6.	Ninzic	Ninzo	tīr (s) (3-X?)				wūr
7.	Northern	Ikulu		tšòllāā	nù-kɔp		
8.	Southeastern	Fyam	téres (3-X?)				dukút
9.	Southern	Lijili	zà-tfɛ (X-3?)				zà-bɛ
10.	Taroid	Tarok (dial.)	ùfàŋzínjín (X+4)		ù-gbópei		
11.	Western	Yeskwa (dial.)		tyúôrá	ó-kóp		
11.	Western	Rukuba (dial.)	ta:ras (3-X?)				u-wùruk
11.	Western	Eggon (dial.)	áfúúní (5+4)		ó-kpo		
11.	Western	Eggon (dial.)	ɔ́fɔ́nì (5+4)		ɔ-kbó		
11.	Western	Hasha	nàniŋ màrɛŋ (4+X)				ā-wük
?	Sambe		tòrò/kà-tóró			jò-wò	

The specific nature of the Platoid numeral system prevents us from providing separate forms for ‘twenty’ and ‘hundred’. The pattern **’20=12+8’* traceable in a number of pertinent languages is reconstructed for Proto-Platoid. A compound nature is also assumed for ‘hundred’.

The results pertaining to the advanced reconstructions of numerals in Proto-Platoid are summed up in the table below (Table 4.48).

Table 4.48: Proto-Platoid numeral system (*)

1	(y)in, di(n), jir, nìŋ	7	5+2, 4+3
2	pa/fa/ha, ba/wa.	8	4 redupl., 5+3
3	tat	9	5+4, 10-1, 12-3, tu(ku)n
4	nai/nas	10	kop, gur/wur
5	tu(ku)n	20	12+8
6	5+1, 3PL	100	?

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4.1.2.9 Nupoid

Let us try to reconstruct the Proto-Nupoid numeral system.

Table 4.49: Nupoid numerals and Proto-Nupoid (*)

Nupoid	Ebira	Gbari	Kakanda	Nupe	*Nupoid
1	òḍ-nyī	gb ^{ma} :- rī,*wī	gú-ní	ni-ní	ni/nyi, wi? ri?
2	èè-vā	ŋ ^{wā} -ba	gú-bà	gú-bà	ba
3	èè-tá	ŋ ^{wā} -tʃa	gú-tá	gú-tá	ta
4	èè-nà	ŋ ^{wā} -ɲi	gú-ni	gú-ni	na/ni
5	èè-hí	ŋ ^{wā} -t ⁿ ù	gú-tũ	gú-tsũ	tun/tnu/tsun, hi?
6	hĩ-nḍ-nyī (5+1)	t ⁿ ú-wī (5+1)	gú-tua-ɲĩ (5+1)	gú-tswà- ɲĩ (5+1)	5+1
7	hĩ-ń-bā (5+2)	t ⁿ â-ba (5+2)	gú-tua-bà (5+2)	gú-twà-bà (5+2)	5+2
8	hĩ-ń-tá (5+3)	t ⁿ â-tʃa (5+3)	gú-tò-tá (5+3)	gú-to-tá (5+3)	5+3
9	hĩ-ń-nà (5+4)	t ⁿ â-ɲi (5+4)	gú-tua-ni (5+4)	gú-twā-ɲi (5+4)	5+4
10	èè-wó	ŋ ^{wā} -wò	gú-wo	gú-wo	wo
20	òò-hū,*tʃé	wo-ʃi	e-ʃĩ	e-ʃi	ʃi, hu?
100	ē-tʃé-hí (20*5)	40*2+20	ʃit-ũ (20*5)	ʃit-sũ (20*5)	20*5
1000	400*5???	100*10		kpá-tsũ (200*5)	?

The Nupoid group is relatively small and homogeneous and poses no problem for reconstruction.

4.1.3 Isolated BC languages

4.1.3.1 Ikaan

The following description of the Ikaan numeral system (Table 4.50) is based on the analysis of data from a number of its dialects.

Table 4.50: Proto-Ikaan numeral system (*)

1	ǰí	7	h-ránèǰí ('6+1')
2	wà	8	nà:náǰí (4 redupl.)
3	tā:s/h-rāhr	9	h-ráòǰí (X-1)
4	nā ⁱ /nā/náhí	10	ò-pú/fú
5	tò:n/h-rò:n/sò:n/cò:nv	20	ù-gbóró (<'sack'), * à-gbá
6	h-ràdá/sàdá/sàrá	100	à-gbá à-h-run(20*5)

4.1.3.2 Akpes

Table 4.51: Akpes numerals

1	í-gbōn, ē-kìnì	7	ī-tǰēnētǰ(i)
2	ī-dīan(i)	8	ā-nāānīǰ(i) (4 redupl.)
3	ī-sās(i)	9	ò-kpòlòǰ(i)
4	ī-nīǰ(i)	10	ī-yōf(i), *t-ēfī
5	ī-fōn(i)	20	ō-gbō(15)
6	ī-tǰānās(i)	100	ī-gbó fōnì (20*5)

The original BC forms for 'five' (**tan*) and 'one' may have been preserved in the term for 'six'. These forms will be treated below as hypothetical.

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4.1.3.3 Oko

Table 4.52: Oko numerals

1	ò-óre, ò-jére	7	ú-fómbòrè (5+2)
2	è-bòrè	8	ònókónokónò(4 redupl.?)
3	è-ta	9	ù-bóòrè(10-1)
4	è-na	10	è-fò
5	ù-pì	20	ó-gbòlò
6	ò-pónóóre (5+1)	100	í-pì

4.1.3.4 Lufu

Table 4.53: Lufu numerals

1	ù-tí	7	5+2
2	(ba)-máhà	8	5+3
3	bá-tá	9	5+4
4	ba-pì	10	ú-wó
5	bá-tsó	20	e-ce
6	5+1	100, 1000	?

4.1.4 Proto-Benue-Congo

4.1.4.1 ‘One’

The reconstruction of the term for ‘1’ is objectively the most challenging (the term is especially difficult to reconstruct in languages with noun classes and complex systems of determinatives). This situation is even more complicated in the Benue-Congo languages, since more than one reconstruction of the term has been suggested. The existing hypotheses must be studied here, especially because the ones pertaining to the etymology of the term were proposed by Kay Williamson, the leading specialist in NC comparative studies. Moreover, Kay Williamson (1989b) used her reconstruction of the term for ‘one’ as an argument in favor of triconsonantal structure of Niger-Congo roots. This hypothesis has been actively developed by Roger Blench (2012b etc.).

It should be noted that our evidence does not support Kay Williamson's reconstruction. Furthermore, her hypothesis regarding the triconsonantal nature of Niger-Congo roots is, in my opinion, untenable. The Bantoid data utilized by Williamson was discussed above. Now let us review the evidence she uses in support of her hypotheses. Originally she treated the root *#-kani* '1' as one of the basic BC roots ('old root', Williamson 1989b: 255). Later she changed her approach (on the basis of a wider NC context, namely on the data from the ljo languages) suggesting a derivation of BC forms from a triconsonantal root ***-'kə'gəni* '1', for which she assumed a different set of reflexes (Williamson 1992: 396). The changes introduced by Williamson in this article are significant. She adds the reflexes of the reconstructed root in Akpes and Nupoid, includes its additional reflexes in Esimbi and Bekwarra (Bantoid), adjusts its reflexes in Cross and Platoid (e.g. by reinterpreting PUC *gá-ni/ *-gwá-nì* previously analysed as an isolated form as a reflex of the root in question), and, finally, omits Kanji and Jukunoid reflexes.

In further interpretation of the BC numeral systems we will use a template chart representing the fourteen branches of BC (Table 4.54). It should be noted that Bantu (as the largest sub-branch of the BC family with the most detailed reconstruction) is treated separately. This means that the Bantoid field will only include non-Bantu forms. The chart below reproduces the data published by Kay Williamson (middle sections) as well as the relevant forms obtained as a result of our step-by-step reconstruction (the rightmost section).

It should be noted that the difference in the results achieved by means of our step-by-step reconstruction (see above) and those of Williamson is significant. According to our evidence, the postulation of the root ***-'kə'gəni* '1' for Western Benue-Congo is unsustainable. The existence of this root in Bantoid is also questionable. In her earlier publication, Kay Williamson quoted its only Bantoid reflex (*a-kina* '1') supposedly attested in Northern Bantoid Tiba (Williamson 1989b: 255). However, the affiliation of Tiba with the Bantoid languages is debatable (a connection with the Adamawa languages is suggested in Boyd 1999). In the article that followed, Williamson quoted another Bantoid form, this time the one attested in Southern Bantoid Esimbi (*keni* '1'). As noted above, this form was probably misinterpreted, because it includes the root *-ni/-nā*. At the same time, as I tried to demonstrate above, a number of related forms may be attested in the Mambiloid languages (Northern Bantoid): Twendi (Cambap) *tʃínī*, Mambila *tʃén*. Thus, we are possibly dealing with Proto-Eastern Bantoid **cin/kin*. In order to decide whether this form is an innovation or a reflex of an inherent Niger-Congo root (as Kay Williamson says) we need to place it into a wider linguistic context.

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Table 4.54: BC *kin/cin ‘1’ and alternative reconstructions

Benue-Congo		
Nupoid	Oko	Kainji
Defoid	Akpes	Platoid
Edoid	Ikaan	Cross
Igboid	Lufu	Jukunoid
Idomoid	Bantu	Bantoid

Williamson 1989b: #-kani ‘1’

Yoruba ò-kǒ		Basa kə Pyem kēŋ Bete-Bendi ì-kǎn, Bokyi kìn, PLC *-kèèn Jukun k̄a
Eloyi kònzé		Tiba a-kina

Williamson 1992: Proto-Atlantic-Congo **-'kə'gəni'1'

Gbagyi gmànyi		
Yoruba ò-kǒ	Ikeram ε-ki	PP2-J -gini, PP4 -yan PUC gá-ni? , PLC -kèèn
Eloyi kònzé		Tiba a-kina, Esimbi keni, Bendi: Bekwarra o-kin

*kin-/cin- forms for ‘1’ (step-by-step data)

		tsin, hin
	ē-kinì, *si	(y)in, kyeŋ, gyin
	ǰí	kin/cin
		ǰífe?
		cin (Mambiloid)

Different colors are used in the charts to distinguish between the Eastern and the Western BC languages. A special marking is used for the Bantu languages due to their overall importance for the reconstruction. The abbreviations in the middle sections follow Williamson op. cit. with PLC-Proto-Lower Cross, PUC – Proto-Upper Cross, PP – Proto-Platoid.

This issue will be addressed later. At this point we will deal with another root for ‘one’ postulated by Williamson. According to her, the root is a Benue-Congo innovation.

Since the root *nā / ni* is distinguishable in Esimbi, it seems logical to treat it together with another set of terms for ‘one’ (#-diin). This data (termed BC innova-

tion by Williamson) compared to the results of our step-by-step reconstruction is quoted in the table below (Table 4.55).

Table 4.55: BC *ni ‘1’ and alternative reconstructions

Benue-Congo		
Nupoid	Oko	Kainji
Defoid	Akpes	Platoid
Edoid	Ikaan	Cross
Igboid	Lufu	Jukunoid
Idomoid	Bantu	Bantoid
Williamson 1989b: BC innovations: #- <i>diŋ</i>		
Gwari ñ-ŋĩ	Oko ðóre	Gurmana nɪ
PY *i-ně		PP2K *-niŋ
		OG è-ně, CD #-niin
Ikwere ñ-ním		PJ *-yiŋ
PIđ *-nyí		Lamja nūné, Ekoid #-jid, -jin
* <i>ni</i> forms for ‘1’ (step-by-step data)		
*ni/nyi		Bunu ù-ŋŋĩni
*ŋé		nìŋ, (y)in, di(n)
		*ni(n)
ŋìné?		*-jin?
nze/je/nye/ye		Esimbi -nə/-ni

Let us review the distribution of this root within the Benue-Congo branches.

Western Benue-Congo. This root can be reliably reconstructed in Nupoid and Defoid, but not in Edoid. In Igboid it might be attested in Ikpeye: *ŋì-né* (*ŋ-iné?*). The root is possibly found in some of the Idomoid languages as well: Etulo, Agatu *ó-yè*, Idoma *é-yè*, Alago *ó-je*, Eloyi (dial.) *ò-nzé*, *ŋgwò-nzé*.

Eastern Benue-Congo. Several Kainji forms deserve closer attention. The Gurmana form quoted by Williamson is unfamiliar to me. It may be related to the Bunu form, but the root itself is uncommon for Kainji and thus cannot be reconstructed. Moreover, the root is only marginally attested in the Platoid languages (single occurrences include Eskwa *è-nyí* ‘1’ and possibly Ikulu *í-ń-jí* ‘1’, and *kòp-ìrì-zīŋ* ‘11’). Another rare form is *di(n)* with an initial oral consonant (e.g. Ayu *ɪ-dɪ* ‘1’, Eggon *ò-rí* ‘1’ and its palatalized variant *tʃiŋ* – cf. *ð-kbó à-tʃiŋ* ‘11’,

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à-kβáhá là-tfíŋ ‘21’). These (etymologically unrelated?) forms, however, should not be reconstructed for Proto-Platoid, because the root *kin* (see above) is clearly distinguishable in the majority of the Platoid branches. At the same time, the Platoid data discredits the reconstruction of the root as **kin/cin*. Multiple arguments can be adduced in favor of the interpretation of the initial velar as a reflex of an archaic noun class prefix, which would yield a Proto-Platoid form **k-in*. This invites the possibility of an etymological connection between the Benue-Congo roots studied above, namely **-in* and **-ni*. The analysis of the Platoid compound numerals points toward the same conclusion. A number of noteworthy forms can be quoted in support of this, cf. Hyam *zìni* ‘1’ but *twaani* ‘6’ (‘5+1’, *twoo* ‘5’), Mada *tānn-èn* ‘6’ (‘5+1’, *tun* ‘5’), Ninzo *tāni* ‘6’ (‘5+1’, *tʷi* ‘5’), Rukuba *tàin* ‘6’ (‘5+1’, *-tún* ‘5’). These Platoid forms bring to mind the case of the Jukonoid term for ‘six’. Kay Williamson quotes a Proto-Jukonoid root **-yinj*. The reasons behind this reconstruction are not immediately apparent, since in the majority of the languages other forms are reserved for this meaning. Her reconstruction may be based on the compound terms for ‘six’ that follow the pattern ‘5+1’ (or rather ‘5+X’, with $X \neq 1$), cf. e.g. Jibu *sùn-jin* ‘6’ (*swana* ‘5’, *zyun* ‘1’), *cìn-jen/ fì-zen* (*swana* ‘5’, *dzun* ‘1’). As noted above, the root in question is not reconstructable for the Platoid languages. The reconstruction of **ni(n)* is assured only for the Eastern Benue-Congo branch (Cross), where it is systematically attested in at least three branches out of five, cf. Proto-Upper Cross (**ni*), Central-Cross (*nin*), and Ogoni (*ne*). Since **ni* can be safely reconstructed for Nupoid, Defoid and Cross, its further comparison to the pertinent roots attested in the languages that belong to other NC branches is required.

In conclusion, it should be noted that regardless of whether a conservative or a more speculative reconstruction (i.e. **kin* and **ni* vs. **k-in/ ni*) is preferred, the resulting root (or roots) is not tri- or disyllabic but rather monosyllabic.

In addition to this, several isolated roots for ‘one’ are attested in Benue-Congo. Undoubtedly, they represent local innovations. At first glance, this is applicable to the most common Bantoid roots for ‘one’, including the Bantu forms *mòì/mòdì mòtí*. This, however, may not be entirely correct for reasons that will be discussed in the next chapter. Another noteworthy root that may be tentatively described as **jir* is attested in both Oko and Platoid.

The table is subject to further interpretation. We will return to it later after the evidence from the other Niger-Congo branches has been collected. A few remarks are in order here:

1. Both Akpes terms for ‘one’ (*ē-kini*, *i-gbōn*) find close parallels in the Cross languages (**kin/cin*, **ni(n)*, **gboŋ/gwan*). The Icheve form *à-máá* is probably borrowed from one of the Bantu languages;

2. The Kainji term finds parallels in the Platoid languages (Ayu, Eten, Tarok, Eggon) and may be etymologically related to the Bantu and Nupoid terms (the morphological structure of the Proto-Bantu form is, however, unclear: **mòdì? *m-òdì? *mò-dì?*);
3. The Oko form is reminiscent of another Platoid form that is tentatively reconstructed as **jir*. The Akpes root *gbōn* '1' finds parallels in the Cross (*gboŋ*) and possibly Edoid languages (*gwo/ wo/ wu*).

4.1.4.2 'Two'

The root **pa* (also found in the Idomoid languages) is reconstructable for Eastern Benue-Congo, but is not systematically attested in Bantu.

The Bantu form (as represented above) does not seem to be related to other Bantoid forms. However, it finds parallels in Defoid and possibly Akpes and Kainji. The most common BC form (**ba/bai*) may go back to **ba-i*, with **ba-* being a noun class prefix. In this case, the BC form may be reconstructed as **ba-di / ba-ji > bai > ba*, which would make the Bantu form the most archaic within Benue-Congo.

These hypotheses will be discussed below, after the evidence from the other BC branches has been reviewed.

Table 4.56: BC stems for '2'

		'2'	'2'	'2'
East	Bantu			bà-dí/bì-dí
East	Bantoid (-Bantu)	pa/fe	ba	
East	Cross	po/pa	bae	
East	Jukunoid	pa(n)/fa(n)		
East	Kainji	-pu?	*ba/bi	re
East	Platoid	pa/fa/ha	ba/wa	
West	Defoid			ji
West	Edoid		va/və	
West	Idomoid	pa		
West	Igboid		bó	
West	Nupoid		ba	
West	Akpes			ī-dīan(i)
West	Oko		è-bòrè	
West	Ikaan		wà	

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4.1.4.3 ‘Three’, ‘four’, ‘five’

Table 4.57: BC stems for ‘3’, ‘4’ and ‘5’

		‘3’	‘4’	‘5’	‘5’
East	Bantu	tat	nàì/(nàí)	táànò	
East	Bantoid (-Bantu)	tat	nai	tan	
East	Cross	ta(t)/ca(t)	na(n)	tan	*gbo(k)
East	Jukunoid	ta	nye	tsoŋ	
East	Kainji	tat	nas	tan	
East	Platoid	tat	nai/nas	tu(ku)n	
West	Defoid	tā	lɛ(n), ne, je	tu(n)/lú(n)	
West	Edoid	sa	ni	sien/su(w)on	
West	Idomoid	ta/la	nè, ndo, he	do/lo, ho, ro/rwo	
West	Igboïd	tó	nó	sé	
West	Nupoid	ta	na/ni	tun/tnu/ tsun, hi?	hi?
West	Akpes	ī-sās(i)	ī-nīŋ(i)	ī-fōn(i), *tan	
West	Oko	è-ta	è-na		ù-pi
West	Ikaan	tā:s/h-rāhr	nā ⁱ /nā/náhí	tò:n/h-rò:n/ sòn/còny	

This is the most stable group of numerical terms within BC. It comprises the roots **tat* ‘3’, **nai* ‘4’, and **tan/ ton* ‘5’ that are very well-known among the specialists in NC studies. Issues pertaining to the phonetic realization of their reflexes will be treated in the next chapter.

4.1.4.4 'Six'

Table 4.58: BC stems and patterns for '6'

East	Bantu	3 redupl.				
East	Bantoid (-Bantu)	<3 redupl.?				
East	Cross	3+3	5+1	di?		
East	Jukunoid		5+1			
East	Kainji	<3?			ci(hi)n	tel
East	Platoid	3PL	5+1			
West	Defoid					fà
West	Edoid	3PL, 3+3				
West	Idomoid			riwi/rowo	ji	hili
West	Igboid				ʃi	
West	Nupoid		5+1			
West	Akpes		5+1?			
West	Oko		5+1			
West	Ikaan					h-ràdá/ sàdá/ sàrá

As the table shows, there was probably no primary Proto-Benue-Congo root for 'six'. Two alternative patterns are traceable, namely '3PL' ('3 redupl.', '3+3') and '5+1'. Other forms are marginal. The phonetic resemblance of the Kainji and Igboid forms is noteworthy.

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4.1.4.5 ‘Seven’

Table 4.59: BC stems and patterns for ‘7’

East	Bantu	càmbà (< **c/saN+2?)		
East	Bantoid (-Bantu)	samba (5+2?)		
East	Cross	5+2		
East	Jukunoid	5+2		
East	Kainji	5+2		
East	Platoid	5+2		4+3
West	Defoid		byē	
West	Edoid		ghie?	
West	Idomoid	5+2	renyi	
West	Igboid			saà
West	Nupoid	5+2		
West	Akpes			ī-tʃɛnɛtʃ(i)
West	Oko	ú-fɔ̀mbòrè (5+2)		
West	Ikaan		h-ránèfi (‘6+1)	

A primary root for ‘seven’ is also indistinguishable. The form **camba/samba* may have lost any phonetic resemblance to its Benue-Congo prototype **7=5+2* in Proto-Bantoid. The Defoid and Edoid forms are phonetically comparable (a shared innovation?).

4.1.4.6 ‘Eight’

Table 4.60: BC stems and patterns for ‘8’

East	Bantu	nai-nai (<4 redupl.)			
East	Bantoid (-Bantu)	na-nai (<4 redupl.)			
East	Cross	4+4			
East	Jukunoid	4 redupl.	5+3		
East	Kainji		5+3	ro/ru	kunle(v)/kunlo
East	Platoid	4 redupl.	5+3		
West	Defoid			jo/ro	
West	Edoid	4 redupl.			
West	Idomoid		5+3		
West	Igboid		5+3		
West	Nupoid		5+3		
West	Akpes	ā-nāānīŋ(i) (4 redupl.)			
West	Oko	ò-nókó-nókóno (4 redupl.?)			
West	Ikaan	nà:ná ^j (4 redupl.)			

In this case, the pattern **nai* ‘4’ > **na(i)-nai* ‘8’ fits the reconstruction better than its alternative. The similarity between Kainji and Defoid is peculiar and may be due to innovations.

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4.1.4.7 ‘Nine’

Table 4.61: BC stems and patterns for ‘9’

East	Bantu			bùá	
East	Bantoid (-Bantu)			bukV	
East	Cross	5+4	10-1		
East	Jukunoid	5+4			
East	Kainji	5+4	10-1		jiro
East	Platoid	5+4	10-1		12-3, tu(ku)n
West	Defoid			sá(n)	dà
West	Edoid			cien/sin	
West	Idomoid	5+4			
West	Igboid				totu/tolu
West	Nupoid	5+4			
West	Akpes				ɔ̃-kpɔ̃lɔ̃f(i)
West	Oko		ù-bɔ̃ɔ̃rɛ̀		
			(10-1)		
West	Ikaan		h-ráɔ̃fɪ		
			(X-1)		

The rightmost column of the table includes many isolated forms (among them some primary ones). The term **buka*, which may appear as an important BC innovation, is reconstructed for Proto-Bantoid. In addition, the pattern ‘9=5+4’ is distinguishable in Proto-Benue-Congo. Like for ‘8’, Defoid and Edoid forms closely resemble each other.

4.1.4.8 ‘Ten’

Table 4.62: BC stems for ‘10’

East	Bantu		kómì/ kámá			
East	Bantoid (-Bantu)	fu	kum/ kam			
East	Cross	fo?		kpo/ kop	ʔo?	job
East	Jukunoid			wo?	kur?	jwe
East	Kainji	pwa		kup/ kpa	kur?	turu
East	Platoid			kop	gur/ wur	
West	Defoid				gwá	
West	Edoid			kpe	gbe	
West	Idomoid	(fu ‘20’)			gwo/ wo	jwo
West	Igboid					dî/ri/ li
West	Nupoid	(hu ‘20’)			wo	
West	Akpes					ī-yōf(i), *t-ēfī
West	Oko	è-fɔ				
West	Ikaan	ò-pú/fú				

This is a heterogeneous group of forms. The root **pu/fu* attested in both Eastern and Western BC is the most likely candidate for BC reconstruction. However, it is missing from Bantoid, for which the term **kum/kam* is reconstructable. The latter form must be a Bantoid innovation. However, assuming that the second consonant may have undergone nasalization in Proto-Bantoid, this form is comparable to a number of other roots, suggesting that **kup/ kop* should be reconstructed for Eastern Benue-Congo. As the table shows, other roots should not be neglected either. They will be treated in combination with the evidence from other NC branches.

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4.1.4.9 ‘Twenty’

Table 4.63: BC stems and patterns for ‘20’

East	Bantu	10*2			
East	Bantoid (–Bantu)	10*2			
East	Cross		*ti/ci?		dip?
East	Jukunoid				‘body’ (di)
East	Kainji	10*2	ʃin/ʃik		
East	Platoid				12+8
West	Defoid			gwú(n), gbolo	
West	Edoid			gie/jie, gboro	
West	Idomoid				fu/hu, su?
West	Igboid			gwɔ̃/ɣ ^h ɔ̃, kpɔɔ	
West	Nupoid		ʃi		hu?
West	Akpes			ɔ̃-gbɔ̃(lɔ̃)	
West	Oko			ɔ̃-gbɔ̃ɔ̃	
West	Ikaan			ù-gbɔ̃rɔ̃ (< ‘sack’), *à-gbá	

It is highly unlikely that the Proto-BC term followed the pattern reconstructed for Proto-Bantoid (*‘20=10*2’). In all likelihood there was no root for ‘twenty’ in Proto-BC at all. It should be noted that numerous branches of Western BC use the root (*g*)*bolo* (possibly related to the lexical root with the meaning ‘sack’) to make ‘twenty’. A shorter root (**gba/gwe*) is reconstructable in the same Western BC branches as well. Its source is likely lexical: it is well-known that the term for ‘twenty’ in the NC languages often goes back to lexemes with the meaning ‘man’, ‘leader’, and ‘body’ (cf. Jukonoid). The resemblance between the reconstructed Idomoid and Nupoid forms is noteworthy. However, these forms might be etymologically related to the term for ‘ten’.

4.1.4.10 ‘Hundred’ and ‘thousand’

Table 4.64: BC stems and patterns for ‘100’ and ‘1000’

		‘100’	‘100’	‘100’	‘1000’
East	Bantu		kámá	gàná, tsa, jànda	nùnù, pèmbì, kótò
East	Bantoid (-Bantu)	20*5?	kam?	gbi? ki?	?
East	Cross	20*5			
East	Jukunoid	20*5			<Hausa
East	Kainji	?			
East	Platoid	?			
West	Defoid	20*5			
West	Edoid	20*5			du, ria/li
West	Idomoid	20*5, 10*10			
West	Igboïd	20*5			puk(w)u
West	Nupoid	20*5			?
West	Akpes	ī-gbó fōnì (20*5)			
West	Oko			í-pì	
West	Ikaan	à-gbá à-h-ruṅ (20*5)			

If Proto-Benue-Congo did not have the term for ‘twenty’, it probably did not have the term for ‘hundred’ either, because the only pattern it could follow is $*100=20*5$. In this respect the Proto-Bantoid innovation ($*kam$) is noteworthy. It resembles another Proto-Bantoid innovation, namely the term for ‘ten’ ($*kum/kam$), which is hardly a coincidence. The possibility that in the cases of ‘ten’ and ‘hundred’ we are dealing with alignment by analogy cannot be excluded. This could explain the irregular nasalization of the root for ‘ten’, cf. Proto-Bantoid $*kup$ ‘10’ \rightarrow kum by analogy with $*kam$ ‘100’. The term for ‘thousand’ was certainly nonexistent in BC.

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4.1.4.11 Summary

Taking this into account, the segmental reconstruction of the Proto-BC numeral system may be suggested (Table 4.65).

Table 4.65: Proto-Benue-Congo numeral system (*)

1	ni, kin/cin (<k-in?), gbon, (o-)di(n)?, (o-)ti?	7	5+2
2	ba-di/ba-ji, pa? ba(i)?	8	4 redupl.
3	tat	9	5+4
4	nai	10	pu/fu, kup/kop, gwo/jwo
5	tan/ton	20	absent? gwa/gwe? <'person'?
6	3PL/3 redupl./3+3, 5+1	100	absent? 20*5

This table gives an overview of the BC evidence that will be used for further comparison with other NC branches.

4.2 Kwa

More than eighty Kwa sources were used for the reconstruction. They are representative of the major groups and sub-groups of this family, which consists of about seventy languages. A plausible internal classification of the Kwa languages does not exist. A step-by-step reconstruction of numerals may well be viewed as another important step in this direction. Our preliminary survey of the pertinent evidence is based on the traditional classification that distinguishes five major Kwa branches. We will start with the study of the numerical terms by branch. Then, individual reconstructions will be evaluated with regard to their potential for the general reconstruction of the Proto-Kwa numeral system.

4.2.1 Ga-Dangme

These two languages exhibit isolated forms of the term for 'one'. Both terms will be preserved for further comparison (note that the first syllable of the Dangme term probably represents a noun class prefix). The term for 'eight' is undoubtedly constructed as '6+2'. The term for 'six' is primary, hence the term for 'seven' must be formed of '6+1'. This would suggest the existence of an additional term for 'one' (*-gō/-wo). Two separate forms are attested for 'hundred'. Apart from that, the Dangme and Ga numeral systems are quite homogeneous.

The Adampe system is in many respects different, so there may be doubts as to whether it indeed belongs together with Dangme. The Adampe evidence will be treated later in this chapter.

Table 4.66: Ga-Dangme numerals

	Dangme	Ga	Dangme	Ga
1	kákē	é-kòomé	7 kpà-à-gō (6+1)?	kpà-wo (6+1?)
2	é-ɲḏ	é-ɲò	8 kpà-a-ɲḏ (6+2)	kpà-a-ɲḏ (6+2?)
3	é-tē	é-tē	9 nēē	nēehú
4	é-ywè/é-wìè	é-ɲwè	10 ɲḏɲmá (PL: ɲḏɲmí)	ɲḏɲmá
5	é-nūḏ	é-nùmḏ	20 ɲḏɲmí éɲḏ (10*2)	ɲḏɲmá -í éɲḏ (10*2)
6	é-kpà	é-kpàa	100 làfá	ò-há, pl. -ì
			1000 à-kpé	à-kpé, pl. -ì

4.2.2 Gbe

The reconstruction of the Proto-Gbe numeral system is straightforward, since alternative forms are few (Table 4.67). It is based on the available evidence from twelve of the Gbe dialects.

Table 4.67: Proto-Gbe numerals and patterns (*)

1	è-dɛ/dɛ-kpo	7	'hand'+2, 5+2
2	è-ve/e-wè	8	e-ɲí, 'hand'+3
3	è-tḏ	9	8+1, 5+4
4	è-nè	10	e-wó, *bula
5	à-tḏḏ	20	10*2, ko
6	à-dḏ/zḏ	40	e-kà
100	40*2+20	1000	à-kpé, kotokū

The Gbe term for 'six' is primary. Its form, however, differs significantly from the (also primary) one attested in the languages of the Ga-Dangme group.

The term for 'eight' seems to be derived from 'four', whereas the term for 'nine' follows the pattern '8+1'.

The forms for 'twenty' follow the pattern 'X*2' in Aja (*bulaa-ve*), Waci-Gbe (*blá-ve*) and Ewe (*blá-vè*), which suggests an alternative form for 'ten' (**bula*).

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The etymological relationship between the term for ‘fifteen’ and a lexical root with the meaning ‘foot’ attested in two of the dialects is an apparent innovation: Maxi-Gbe *à-fɔ-tɔ́* (‘foot’, ‘3’) and Kotafon-Gbe *fɔ-tɔ́* (‘foot’, ‘3’). This pattern is attested in a number of the NC languages (including Atlantic).

A primary term for ‘forty’ is distinguishable (hence ‘50=40+10’, ‘60=40+20’, ‘70=40+30’, ‘80=40*2’, ‘90=40*2+10’).

4.2.3 Ka-Togo

Ka-Togo is a quite diverse group of the Left Bank languages. The reconstructions for each of its three branches are provided in the table below (Table 4.68). Its rightmost column lists forms and patterns that are the most likely candidates for the Proto-Ka-Togo reconstruction.

Table 4.68: Proto-Ka-Togo numeral system (**)

	*Avatime-Nyangbo	*Kebu-Animere	*Ikposo-Ahlo-Bowili	**Proto-Ka-Togo
1	o-le	ʈé-ì, bɛ-xi	è-dɪ/è-dɪ-gbo	di
2	ɛ-bha	din/ji	è-va/è-fwa	bha, din
3	ɛ-ta	tha	è-ta/è-la	ta
4	ɛ-né	nie	è-na	na/nɛ
5	ɛ-tí, ɛ-cu	thu(ŋ)	è-tɔ	tu(N)
6	golo/holo	kòràŋ	è-gɔlu/è-wɔlu	golo/ koro
7	6+1	10-3	6+1, kɔ̀nɔ̀, ù-zòni	6+1
8	10-2? a-nse	4*2	è-lɛ?, <4	4*2, nse/lɛ?
9	10-1? zi+3?	5+4?	8+1, 10-1?	8+1? 10-1
10	kɛ-fɔ	the	wa/wu, i-jo, *bula	fo/wo, te, bula
20	10*2	10*2?	bula-2, lye-2, ŋué-2, tɛ́éyá?	10*2
100	a-lafa (< Ewe)	tùùrù, sala	gbɔwa	lafa?
1000	a-kpe (< Ewe?)	lààfā	a-kpe	a-kpe

It needs to be stressed that the forms marked with /**/ are only suggestive and should not be taken at face value. They are not reconstructions in the strict sense and only serve for comparative purposes, so the absence of a tonal marker in a reconstructed form should not be considered meaningful. It only shows that at this point the available evidence does not allow reconstructing a tone in the pertinent case.

4.2.4 Na-Togo

An overview of numerical terms as attested in the branches of Na-Togo and some isolated languages is provided below (Table 4.69). A tentative reconstruction of the Na-Togo numeral system can be found in the rightmost column.

Table 4.69: Proto-Na-Togo numeral system (**)

	Adele	Anii	*Lelemi	*Likpe-Santrokofi	Logba	**Proto-Na-Togo
1	è-kí	ḍīŋ, *mi	ù-nwi/ḍ-wě	nòé/nwîi (lêwé)	i-kpe	i-we/kpe?, di(N)?
2	è-nyḍḍn	ī-pīḍ	í-ḡó	ḡó/núḍ	i-nyḍ	i-nyḍ
3	à-sì	ī-rīū	è-te	tié	i-ta	i-ta
4	è-nàà	ī-nāŋ	í-na	na	i-na	i-na
5	tòn	ī-nḍŋ	è-lo	nó	i-nú	i-no(N)
6	kòḍòròn	ī-kòlōŋ	è-ku	kua	i-gló	golo/kolo, ku
7	6 + 1	kūlūmī (6+1?)	4+3?	6+1?	6+1	6+1
8	niyè	4PL	4PL?	4PL?	4PL	4PL
9	yè-1	tjīīnī	10-1	nase	X-1	10-1
10	fò	tḥb	vu/we	fo/wo?	u-ḍú	fo, ḍu, tḥb
20			10*2	10*2		10*2, ḍ-ḍḍ(n), ā-kōō, dikpīlin
50	20*2+10	20-PL+10	ti	10*5	10*5	20*2+10
100	20*5	20*5, gā-sḥwā	50*2, lafa	kò-lòfá	u-ga	20*5, lofa, u-ga
1000	200*5	ū-fḥlḥ, kōtōkū	pim, ka-kpi	kḍ-kpí	a-kpi	a-kpi, pim?

The Lelemi term for ‘fifty’ (*li-ti*) is peculiar because it is a likely source of ‘hundred’: *è-ti á-ḡó* (‘50*2’).

4.2.5 Nyo

The Nyo group, which is comprised of dozens of languages, is the most representative within the family. For this reason (even though the Nyo numeral systems are closely related to each other) they will be studied separately (by sub-group) and then compared to each other.

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4.2.5.1 Agneby (Abbey, Abiji, Adioukru)

Alternative sources representative of these three languages are quoted below (Table 4.70). Significant variation of forms is sporadically attested.

Table 4.70: Proto-Agneby numeral system (*)

	Abbey1	Abbey2	Abiji1	Abiji2	Adioukru1	Adioukru2	*Proto-Agneby
1	ɲkpɔ̃	ɲkpɔ̃	ń 'nɔ̃	ɲnɔ̃	ɲâm	ɲâm	N-kpɔ̃, ɲ-âm, *a-ri
2	āpɔ̃	āpɔ̃	áá 'nɔ̃	áānɔ̃	yópɲ	ɲópɲ	a-pɔ̃/nɔ̃
3	ārí	ārí	ǣǣ 'tí	ǣǣtí	ɲâhɲ	ɲâhɲ	a-tí(N)/ ri
4	ālɛ́	ālɛ́	ǣǣ 'lá	áālá	yâr	jâr	a-ní/la, jar
5	ōní	ōní	éé 'né	éēnē	yên	jên	o-ne,lɔ̃hɔ̃, jên
6	lɔ̃hɔ̃	lɔ̃hɔ̃	náhɔ̃à	náhɔ̃à	nɔ̃hɲ	nɔ̃hɲ	hu(n)
7	lɔ̃hɔ̃-ārí	lɔ̃hɔ̃-ārí	nɔ̃bɔ̃	nɔ̃ ^m bɔ̃	lɔ̃bɲ	lɔ̃bɲ	6+1, bu(n)
8	èpyè	èp'è	nówò	nówò	níwɲ	níwɲ	è-pyè, wo(n)
9	ɲákó	ɲāákó	nǣ 'bré	nǣ ^m brè	libárm	libárm	bare(-n)
10	ènɛ́	ɲnè	ńdíɔ̃	ɲdíɔ̃	lêw	lêw	nɛ(n) (< 5PL?), diw/ liw
20	ēbrá-ɲɔ̃	òbrāɲɔ̃	àbrúáí	àbrúáí	líkj	líkj	<'hand' *2?,li-kɲ
100	yā	jā	yǎ	jǎ	ékɲ-yén	ékɲ jên (20*5)	ja, 20*5
1000	àkpī	àkpī		àkpí		fândí (Engl.?)	a-kpi

The presence of the primary terms for 'seven', 'eight' and 'nine' is an important characteristic of this sub-group.

4.2.5.2 Attié

Internal reconstruction of the Attié numeral system yielded the following results (Table 4.71).

Table 4.71: Attié numeral system (*)

1	kə(n)	7	nson
2	mwə(n)	8	ma-4? 2 de 10?
3	ha(n)	9	ŋgwan
4	dʒí(n) < *kɥe?	10	kɛŋ
5	bə(n)	20	'hand' (bwa?)*2?
6	mu(n)	100	ja
		1000	a-kpi

4.2.5.3 Awikam-Alladian

No numerical terms (except for 'one' and 'nine') are reconstructable on the sub-group level. This raises doubts as to whether these languages should indeed be grouped together. A representation of the pertinent forms is presented in the table below (Table 4.72) and may serve as a starting point for further discussion.

Table 4.72: Avikam-Alladian numerals

	Awikam	Alladian	Awikam- Alladian		Awikam	Alladian	Awikam- Alladian
1	étɔ́	ɛ̀tò	ɛ-to	7	ébyɔ́	ɛ̀bwè	é-byɔ́, ɛ̀-bwè
2	ápɔ́	ā̀yrè	á-ɲɔ́, ā̀-yrè	8	ètyé	ḕqri	è-tyé, ḕ-qri
3	ázá	ā̀ò	á-zá, ā̀-ò	9	émrɔ́	ēmwrò	é-mrɔ́
4	àná	ā̀zò	à-ná, ā̀-zò	10	èjú	ḕvà	è-jú, ḕ-và
5	ànú	ḕnrì	à-ɲú, ḕ-nrì	20	èvé	ḕqá, *ḕkòqì	è-vé, ḕ-qá
6	áwá	ḕwrè	á-wá, ḕ-wrè	100	àkpá 'ɲú	20*5	20*5, àkpá 'ɲú

4.2.5.4 Potou-Tano

4.2.5.4.1 Potou

The following forms are distinguishable in the Potou sub-group (Table 4.73).

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

Table 4.73: Potou numerals

	Ebrie	Mbato	*Potou		Ebrie	Mbato	*Potou
1	bè/brè	lóbō	bè/brè, ló-fō; ce/se	7	ák ^h wác ^h è	óbīsé	6+1
2	mò	ónoó	noó	8	ábyá	ógbī	byá/ gbī
3	ɓwàdʔyá	néjē/nójē	dʔyá/je	9	ábrò	ótrú	brò, trú
4	ɓwèdʔí	néní/nóní	dí/ni	10	áwó	ówā	wó
5	mwàná	nénā	na	20	áp ^h è	ópē	pē
6	ák ^h wá	ókoā	kwa	100	àyà	yà	ya

4.2.5.4.2 Tano

The Tano branch consists of nearly thirty languages. It seems reasonable to treat them by sub-groups.

Western Tano

Table 4.74: Western Tano numerals

	Abure1	Abure2	Eotile	Western Tano
1	okuè	ókúè	ìkò	o-kue
2	apù	ápù	àpò	a-pu(n)
3	nɔ̀à	ínɔ̀à	àhá	n-ha(n)
4	nnàn	ínà	ànè	n-na(n)
5	nnú	ínú	ànù	n-nu(n)
6	nciè	íciè	àhíè	n-cíè/híè
7	ncùn	íçù	áfà	n-cùn, à-fà
8	mòkùé	mòkúé	ànèmrò	mò-kùé, à-nèmrò
9	puáléhùn	pòàlòhò	brúkú	puáléhùn, brúkú
10	òblún	òbùlù	èdí	ò-bùlù, è-dí
20	éfin	éft	èfè	é-fi(n)
100	èvá okuè	èyá kúè	átá	è-vá/è-yá, átá
1000	akpí okuè			a-kpi

Central Tano Akanic (Table 4.75):

Table 4.75: Akanic numerals

	Akan1 (Twi dial.)	Akan2	Abron1	Abron2	*Akanic
1	baakó~	baakó	bakū	bìàkǔ?	ba-kó(n)
2	əbié-ń	mmie-nú	mie-nu	mìènú?	mie-nú
3	əbiè-sá~	mmeε-nsá	mie-nsá	mìènzá?	mie-nsá(n)
4	à-náń	(ε)náń	nain	ńnáí	náń
5	ə-núm	(e)núm	num	ńnúm	núm
6	ə-siá~	(e)nsiá	nsiä	ńziä	siá(n)
7	ə-són	(ε)nsón	nsɔ	ńzǔǔ	só(n)
8	à-wòtɔwé/tw/	nwɔtwé	ɲɔtʃwie	wɔtɔtɪ	twé/cué
9	à-krón	(ε)nkrón	ɲkrɔŋ	ɲgɔnɔ	n-krón
10	dú	(e)dú	du	dú?	dú
20	əduònú	aduonú	edu enu	àduònú	10*2
100	əhà	ɔha	ɔha	hà	ɔ-ha
1000	àpím	apém	apim		a-pím

Bia The numeral systems in these languages (Agni, Baoule, Sefwi, Nzema, Ahanta, and Jwira-Pepesa) are virtually identical and can be described as follows (Table 4.76).

Table 4.76: Proto-Bia numeral system (*)

1	ko(n)	7	su(n)
2	nu, ɲɔ(n)	8	cɔε/twε
3	sa(n)	9	ɲgɔlã, nkrón
4	na(n)	10	bulu
5	nu(n)/nu(m)	20	10*2
6	sia(n)	100	ya
		1000	akpi

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Guang This sub-group has two branches, Southern and Northern Guang, which consist of four and eleven languages, respectively). Despite, the Guang numeral systems do not differ significantly, hence quoting individual forms seems unreasonable. Our reconstructions for both branches, as well as the general Guang reconstruction, are given below (Table 4.77).

Table 4.77: Guang numerals

	*Northern Guang	*Southern Guang	**Guang
1	kɔ́	kɔ	kɔ
2	ɲɔ́	ɲɔ	ɲɔ
3	sá	sa(n)	sa(n)
4	ná	ne(n)/na	na(n)
5	nú(n)	nu/ni	nu(n)
6	síyé	siɛ(n)	siɛ(n)
7	súnɔ́	súnɔ́	súnɔ(n)
8	bùrùwá, kwé	twi/cwi	bùrùwá, kwé/cwi
9	kɔ̀ɔ̀ɔ̀, sà̀ngɔ́ɔ́?	kpunɔ	kpunɔ, sà̀ngɔ́ɔ́?
10	dú	du	du
20	o-ko, 10*2	10*2	10*2, ko?
100	lafa (< Akan?)	ɔ̀lɔ̀fé/lafa	lafa
1000	kpín, pim	a-kpe	kpi(N), pim

Krobu; Basilia-Adele; Ega To make our presentation complete, the evidence of these three isolated Tano languages is presented in the table below (Table 4.78).

4.2.6 Proto-Kwa

Intermediate reconstructions suggested above should be compared in order to reconstruct the forms of the Proto-Kwa numerals. It seems reasonable to group potentially related forms (or patterns) together. The rightmost column contains isolated forms attested in one particular group only.

4.2.6.1 ‘One’

The Awikam-Alladian term for ‘one’ is definitely an innovation.

The root **di* is attested in four branches out of five and thus is likely reconstructable at the Proto-Kwa level.

Table 4.78: Numerals in Tano isolated languages

	Krobu	Basila-Adele	Ega
1	kɔ̃	kɔ̃, li/diŋ	ì-lō-gbó
2	ʃí-ŋɔ̃	ɲúà	ì-ŋò
3	ń-sá	sa	ì-tà
4	ń-ná	na	ì-lè
5	ń-nù	ton, nun	ì-ŋwè
6	ń-sỹē	koron	5+1
7	ń-sò	6+1?	5+2
8	mò-kwé	4-4, cǔé	5+3
9	ŋ-gròā	-1, gwalan	5+4
10	brú	fo, teb, bulu	ì-zù
20	à-brūāé (10*2?)	dikpilin, koo, bulV	ú-glū
100	yǎ	20*5	20*5
1000		kpen?	

Table 4.79: Kwa stems for '1'

	1	1	1	1
*Ga-Dangme	ká-kē, *go/wo			é-kómé
*Gbe	ɖe-kpo	è-ɖe		
*Ka-Togo		di		
*Na-Togo	i-wε/kpε?	di(N)?		
*Nyɔ:				
*Agneby	N-kpɔ	*a-ri		ɲ-âm
Attié	kə(n)			
Awikam			é-tɔ̃	
Alladian			ē-tò	
<i>Potou-Tano</i>				
Potou	*ce/se			bɛ̃/brɛ̃, ló-fō
<i>Tano</i>				
Western	o-kue			
<i>Central</i>				
Akanic	ba-kó(n)			
Bia	ko(n)			
Guang	kɔ			
Krobu	kɔ̃			
Ega	ì-lō-gbó	ì-lō-gbó (< *li-kpo?)		

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The forms given in the left column are more problematic. Each of them contains a velar consonant (the Potou form **ce* may have resulted from the palatalization of a velar before a front vowel, *ce* < **kue* – cf. Western Tano).

Regular phonetic correspondences between these languages have not been established and therefore cannot be used for purposes of reconstruction. In any case, the following considerations might prove useful for the NC reconstruction. The inventory of forms attested in the eighty Kwa idioms may seem rather diverse. However, only two of them may be considered for the Proto-Kwa reconstruction, namely **di* and **k(p)o* (or the compound form **di-kpo* suggested by the Gbe (*d̥e-kpo*) and Ega (**li-gbó?*) forms).

4.2.6.2 ‘Two’

Table 4.80: Kwa stems for ‘2’

	‘2’	‘2’	‘2’	‘2’
*Ga-Dangme	é-ɲò(n)			
*Gbe			è-ve/e-wè	
*Ka-Togo		din		bha
*Na-Togo	i-nyɔ			
*Nyo				
*Agneby	a-ɲɔ/nɔ̄			
Attié			mwə(n)	
Awikam	áɲɔ̄			
Alladian		āyɾè		
<i>Potou-Tano</i>				
Potou	nōɔ̄			
<i>Tano</i>				
Western	a-ɲu(n)			
<i>Central</i>				
Akanic	mie-nú			
Bia	nu, ɲò(n)			
Guang	ɲó			
Krobu	jí-ɲɔ̄			
Ega	ì-ɲò			

The only form reconstructable at the Proto-Kwa level is evidently **ɲɔ*.

4.2.6.3 ‘Three’ and ‘Four’

Table 4.81: Kwa stems for ‘3’ and ‘4’

	‘3’	‘4’	‘4’
*Ga-Dangme	é-tě		é-Ʒwè
*Gbe	è-tǔ	è-nè	
*Ka-Togo	ta	na/nε	
*Na-Togo	i-ta	i-na	
*Nyo			
*Agneby	a-ti(N)/ri	a-ní/la	jar
Attié	ha(n)		dʒí(n) < *kɥe?
Awikam	ázá	àná	
Alladian	āò		āzò
<i>Potou-Tano</i>			
Potou	dyá/je	dī/ni	
<i>Tano</i>			
Western	n-ha(n)	n-na(n)	
<i>Central</i>			
Akanic	mie-nsá(n)	náín	
Bia	sa(n)	na(n)	
Guang	sa(n)	na(n)	
Krobu	ń-sá	ń-ná	
Ega	ì-tà	ì-lè	

Just as in the majority of the NC branches, the roots for ‘three’ and ‘four’ are the most persistent. Suggested Proto-Kwa reconstructions are **ta* and **na* respectively.

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4.2.6.4 'Five'

Table 4.82: Kwa stems for '5'

	'5'	'5'	'5'
*Ga-Dangme		é-nùḍ	
*Gbe	à-tṣṣ		
*Ka-Togo	tu(N)		
*Na-Togo		i-no(N)	
*Nyo			
*Agneby		o-ne	l̥h̥ò, j̥èn
Attié			bə(n)
Awikam		ànú	
Alladian			ēnrì
<i>Potou-Tano</i>			
Potou		na	
<i>Tano</i>			
Western		n-nu(n)	
<i>Central</i>			
Akanic		núm̃	
Bia		nu(n)/nu(m)	
Guang		nu(n)	
Krobu		ń-nù	
Ega		ì-ɲwè	

The root **tan* ('five') is only traceable in the Left Bank languages. Another root, commonly attested in other languages (**nun*), is found in these languages as well. Both roots should be considered for the reconstruction (note that the former is comparable to the pertinent form reconstructed for Proto-Bantu).

4.2.6.5 ‘Six’

Table 4.83: Kwa stems for ‘6’

	‘6’	‘6’	‘6’	‘6’
*Ga-Dangme		é-kpà		
*Gbe			à-dě/zě	
*Ka-Togo	golo/koro			
*Na-Togo	golo/kolo	ku		
*Nyo				
*Agneby		hu(n)		
Attié				mu(n)
Awikam				áwá
Alladian	ē-wrè			
<i>Potou-Tano</i>				
Potou		kwa		
<i>Tano</i>				
Western			n-cìè/híè	
<i>Central</i>				
Akanic			sìá(n)	
Bia			sia(n)	
Guang			siε(n)	
Krobu			ń-sỹē	
Ega				5+1

The evidence presented in Table 4.83 is inconclusive. At this stage our task is to process the complex Kwa data so that it can be compared to the evidence of other NC languages. In this respect, three provisional Kwa forms are noteworthy: **golo/kolo*, **kua*, and **cie*. In any case, as the forms for ‘seven’ suggest, the Proto-Kwa term for ‘six’ was probably primary.

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4.2.6.6 ‘Seven’

Table 4.84: Kwa stems and patterns for ‘7’

	‘7’	‘7’	‘7’	‘7’
*Ga-Dangme	6+1			
*Gbe				5+2, ‘hand’+2
*Ka-Togo	6+1			
*Na-Togo	6+1			
*Nyo				
*Agneby	6+1		bu(n)	
Attié		nson		
Awikam			ébỹ	
Alladian			ēbwè	
<i>Potou-Tano</i>				
Potou	6+1			
<i>Tano</i>				
Western		n-cùn		
<i>Central</i>				
Akanic		só(n)		
Bia		su(n)		
Guang		súnɔ(n)		
Krobu		ń-sô		
Ega				5+2

The forms presented in the table above point toward the pattern ‘6+1’ being used for the Proto-Kwa term for ‘seven’, whereas Proto-Nyo developed the primary term **sun*.

4.2.6.7 ‘Eight’

Table 4.85: Kwa stems and patterns for ‘8’.

	‘8’	‘8’	‘8’	‘8’	‘8’
*Ga-Dangme					6+2
*Gbe		e-ní	‘hand’+3		
*Ka-Togo	4*2	nse/le?			
*Na-Togo	4PL				
*Nyo					
*Agneby				è-pyè	wo(n)
Attié	ma-4?				10-2?
Awikam		ètyé			
Alladian		ēyri			
<i>Potou-Tano</i>					
Potou				ɔ́yá/gɔ́ɓi	
<i>Tano</i>					
Western		mò-kùé			à-nèmrɔ̀
<i>Central</i>					
Akanic		twé/cué			
Bia		cɔɛ/twɛ			
Guang		kwé/cwi			
Krobu		mò-kwé			
Ega			5+3		

Based on the evidence attested in the table above, the Proto-Kwa term for ‘eight’ may be reconstructed as either primary (**kwe/kye*) or derivative, in which case it must have been based on ‘four’ (**4PL*).

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4.2.6.8 ‘Nine’

Table 4.86: Kwa stems and patterns for ‘9’

	‘9’	‘9’	‘9’	‘9’	‘9’	‘9’
*Ga-Dangme						něě(hú)
*Gbe	8+1		5+4			
*Ka-Togo	8+1?		10-1			
*Na-Togo			10-1			
*Nyo						
*Agneby		bare(-n)				
Attié					ngwan	
Awikam		émrɔ́				
Alladian		ēmwrò				
<i>Potou-Tano</i>						
Potou		brò				trū
<i>Tano</i>						
Western		brúkú				puáléhòn
<i>Central</i>						
Akanic				n-		
				krón		
Bia				nkrón	nglǎ	
Guang						kpunɔ, sàngóó?
Krobu					ɲ-grǎ	
Ega			5+4			

This is the hardest form to interpret. A rare pattern ‘8+1’ is attested in the Left Bank languages. In contrast to this, the Togo pattern is ‘10-1’, while the Nyo term (**brɔ/mrɔ*) is ‘primary’. The latter is probably connected to the term for ‘ten’, although this connection does not necessarily imply a derivation (‘10-1’) and could be explained by analogy. All three forms/patterns are considered for reconstruction.

4.2.6.9 ‘Ten’

Table 4.87: Kwa stems for ‘10’

	‘10’	‘10’	‘10’	‘10’	‘10’	‘10’
*Ga-Dangme						ɲòŋmá
*Gbe	e-wó	*bula				
*Ka-Togo	fo/wo	bula			te	
*Na-Togo	fo		ɗú		təb	
*Nyo						
*Agneby				diw/liw		nɛ(n)<5PL?
Attié						kɛŋ
Awikam			ɛ̀jú			
Alladian	ɛ̄-và					
<i>Potou-Tano</i>						
Potou	wɔ					
<i>Tano</i>						
Western		ò-bùlú		è-dí		
<i>Central</i>						
Akanic			ɗú			
Bia		bulu				
Guang			du			
Krobu		brú				
Ega			ì-zù			

Isolated forms are attested in Ga-Dangme and Attié. The root *tə(b)* is traceable in the Ghana–Togo Mountain languages (Togo-remnant) and is not found elsewhere. Thus we are dealing with another isogloss suggesting that these languages belong to the same branch. The stem **du* supported by R. Blench could be proposed for Proto-Kwa. This stem is indeed attested in the majority of the groups that do not belong to the Left Bank languages (including Na-Togo).

The stem **bula* (Left Bank)/**bulu* (Tano) is distributed fairly evenly.

Finally, a Niger-Congo root reflected in Kwa as **fo/wo* can be reconstructed in a number of languages.

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4.2.6.10 ‘Twenty’

Table 4.88: Kwa stems and patterns for ‘20’

	‘20’	‘20’	‘20’	‘20’	‘20’	‘20’
*Ga-Dangme	10*2					
*Gbe	10*2	ko				
*Ka-Togo	10*2					
*Na-Togo	10*2	ā-kōō	dikpìlìn			ɔ-dɔ(n) (<10?)
*Nyo						
*Agneby	‘hand’ (bra)*2?		li-kɲ			
Attié	‘hand’ (bwa?)*2?					
Awikam				è-vé		
Alladian		*èkòùì		è-ɥá		
<i>Potou-Tano</i>						
Potou					pɛ	
<i>Tano</i>						
Western					é-fi(n)	
<i>Central</i>						
Akanic	10*2					
Bia	10*2					
Guang	10*2	ko?				
Krobu	à-brūā́é (10*2?)					
Ega						ú-glū

The pattern ‘10*2’ attested in the majority of the branches. The root *ko is also to be taken.

4.2.6.11 ‘Hundred’ and ‘thousand’

In addition to the pattern ‘20*5’, the roots *lafa/lofa* and **ya/ja* (Nyo) are reconstructable for ‘hundred’. The latter may be etymologically related to **ga/ha*.

The term for ‘thousand’ is commonly attested as **a-kpi*. Its less common by-form is **pim*.

Table 4.89: Kwa stems and patterns for '100' and '1000'

	'100'	'100'	'100'	'100'	'1000'	'1000'
*Ga-Dangme	láfá		ò-há		à-kpé	
*Gbe				40*2+20	à-kpé	
*Ka-Togo	lafa?				a-kpe	
*Na-Togo	lofa	20*5	u-ga		a-kpi	pim?
*Nyo						
*Agneby		20*5	ja		a-kpi	
Attié			ja		a-kpi	
Awikam				àkpá '1-2		
Alladian		20*5				
<i>Potou-Tano</i>						
Potou			ya			
<i>Tano</i>						
Western			è-vá/è-yă	átá	a-kpi	
<i>Central</i>						
Akanic			ɔ-ha			a-pím
Bia			ya		a-kpi	
Guang	lafa				kpi(N)	pim
Krobu			yă			
Ega		20*5				

Table 4.90 lists provisional Proto-Kwa reconstructions based on the evidence discussed above.

Table 4.90: Proto-Kwa numeral system (*)

1	di-kpo	7	6+1
2	ɲɔ, **di?	8	4PL, kwe/kye
3	ta	9	10-1?
4	na	10	fo/wo, bula, du
5	nu(n), ton	20	10*2, ko
6	golo/kolo, kua, cie	100	20*5, lofa, ja/gya?
		1000	kpi, pim

The remaining roots and patterns are probably innovations that developed separately within a branch/language. They may help to adjust the internal classification of the Kwa languages.

4.3 Ijo

According to traditional classification, the Ijo family is comprised of the Ijaw languages and the Defaka language. Some scholars express doubts as to whether the latter indeed belongs to this family. According to Roger Blench, “The Ijo languages constitute a well-founded group, but the membership of Defaka (constituting Ijoid) remains problematic. Defaka has numerous external cognates and might be an isolate or independent branch of Niger-Congo which has come under Ijo influence” (Blench 2013).

Ijaw languages consist of the Eastern and the Western groups (the latter is sometimes called Central).

The following reconstruction is based on the evidence of all three Ijo branches (Table 4.91).

Table 4.91: Proto-Ijo numeral system

	Defaka	*East	*West	**Ijo
1 (qualifying)	gbérí	gbérí	?	?
1 (counting)	?	ḡgèi	kènɪ	*n-kèni
1 in 6 (5+1)	–	die/ie	die/zie	*die
2	mààmà	màmì	maamɔ	*mamV
3	táátó	tárú	tárɔ	*tató
4	nèi	i-neĩ	néin/nóin	*néin
5	túúnò	sónó	sɔ̃nɔ̃-rɔ̃	*túnó
6	mààngò	5+1	5+1	*5+1
7	5+2	5+2	5+2	*5+2
8	5+3	4+4	4+4	*4+4
9	5+4	5+4	5+4?	*5+4
10	wói	ójí/àtié	ójí	*(w)ójí
15	10+5	jàé	dié	*dié
20	síi	sí	síi	*síi

Both qualifying and counting terms for ‘one’ are attested in the Eastern Ijo languages (e.g. in Ibani). The Defaka form may be a borrowing. An unexplained allomorph for ‘one’ is attested as a part of the term for ‘six’ in Ijaw (?).

The root for ‘two’ (**mam*) is an Ijo innovation. It has no parallels outside this language family. Its phonetic similarity to several other forms is a mere coincidence, e.g. *ma-* in the Jaad (Atlantic) *maae* does not belong to the root and can be

explained as a class prefix. The lexical meaning ‘twin, pair’ (as attested in Nembe (East) according to (Kaliai 1964)) may underlie the Ijo term. However, no reliable parallels for this term with the meaning ‘twin, pair’ are establishable in NC.

The root for ‘three’ is apparently of NC origin, with its most archaic form attested in Defaka.

The term for ‘four’ is undoubtedly a reflex of the NC root.

The term for ‘five’ probably goes back to the NC root **tan(o)*. As in the case of ‘three’, its most archaic form is found in Defaka.

The terms for ‘six’, ‘seven’, and ‘nine’ follow the common patterns (‘5+1’, ‘5+2’, and ‘5+4’ respectively).

The Ijaw term for ‘eight’ must have derived from ‘four’ by means of partial reduplication (**ni-néin*). This pattern is reconstructable on the Proto-NC level and will be discussed at length in the next chapter.

A specific counting term for ‘ten’ is reconstructable in the Eastern Ijo languages (**àtié*). The Defaka form is comparable to those found in the Ijaw languages.

A special form for ‘fifteen’ is reconstructable in Ijaw (**dié*), cf. e.g. the Nembe evidence: *dié-èsi* ‘300’ (=‘15*20’). This form may go back to Ijaw **dîè* ‘divide; separate into parts; split or break up into parts; share’, ‘distribute, donate’, cf. Nembe *dîè*, Ibani (Koelle 1963[1854]) *dîè-*, *dîé*.

As in a number of other languages that belong to different families within NC, a special form is attested for the term for ‘twenty’ (**sîi*). The term itself has several functions. It serves as a basis for a number of other terms for tens (also in Defaka), e.g. ‘40=20*2’, ... ‘100=20*5’. The Ijaw terms for 16–19 are based on it as well, e.g. ‘16=20–4’, etc.

4.4 Kru

Our analysis of the Kru numerals is based on nearly forty sources representative of five major groups and eleven major subgroups of the family. Preliminary reconstructions of the pertinent numerical terms (by sub-group) are represented in commented tables below.

4.4.1 ‘One’, ‘Two’ and ‘Three’

As in the majority of the NC languages the term for ‘three’ is the most persistent: the root **taa(n)* can be reliably reconstructed for Proto-Kru.

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Table 4.92: Kru stems for ‘1’-‘3’

	‘1’	‘1’	‘1’	‘2’	‘2’	‘3’
Aizi		mumɔ	yre	i-ft		i-ta
<i>Eastern</i>						
Bakwe/Wané	dô			sô		ta
Bete/Godié		ɓlo/gbolo		sɔ		ta
Dida/Neyo		bolo		só		ta
Kodia		gbɔɔ/ɓɔɔ		sɔ:		ta:
Kuwa	dee			sɔr		tãã
Seme	dyuõ		byéé		nĩ	tyáár
<i>Western</i>						
Bassa ¹⁴	doo	(g)boo?		sɔ́		tã
Grebo ¹⁵	do(o)			sɔ́	hwã/hã	taa(n)
Klao/Tajuasohn	do			son		tan
Wee ¹⁶	due/too			sɔn		taan

The same is applicable to the root for ‘two’ reconstructed as **so(n)* in Proto-Kru (isolated forms are attested in the Seme and Grebo sub-groups only). It should be noted that in general the Seme numeral system is peculiar in many respects. These peculiarities (e.g. Seme being the only language with a full set of primary terms covering the sequence from ‘one’ to ‘ten’) may be due to the isolated status of the language. In his recent article entitled “Le sèmè/siamou n’est pas kru” Vogler argues that Seme is not a Kru language (see Vogler 2015). On the basis of a comparison between Kru, Gur and Mande (Samogo) morphology and lexicon he concludes that Seme is either remotely related to the Mande languages or represents a separate branch of Niger-Congo. As we hope to demonstrate below, Seme shows systematic correspondences with neither Kru nor Mande (including the contact Mande languages – Samogo and Jowulu).

‘One’. It is likely that the root **do* should be reconstructed on the Proto-Kru level. However, there is enough evidence for reconstructing the alternative root **(g)bolo*.

¹⁴Bassa, Dewoin, Gbii.

¹⁵Grebo, Krumen, Glio-Oubi.

¹⁶Wee is a Western Kru group which includes (among other languages) Sapo, Krahn, Nyabwa, Wobe.

4.4.2 ‘Four’ and ‘Five’

Table 4.93: Kru stems for ‘4’ and ‘5’

	‘4’	‘4’	‘4’	‘5’	‘5’	‘5’
Aizi			yebi	yu-gbo		
<i>Eastern</i>						
Bakwe/Wané		hiɛ ⁴	mrɔ:	ḡbàà, ɲ ^w ũ		
Bete/Godié			mɔ-wana	gbu/gbi		
Dida/Neyo	na			gbí		
Kodia	na			ⁿ gbɣ		
Kuwa	ɲijɛhe					wàyòò
Seme			yur			kwɛ̃l
<i>Western</i>						
Bassa	hì-nyɛ(n)				h-mm	
Grebo		hɛn		gbə	mm	hun
Klao/Tajuasohn	nyìè	hɛn			mù, hoom? (< m?)	
Wee	nyìè				mm	

The forms for ‘four’ in the left column apparently are the reflexes of the NC root that is preserved in its archaic form **na* in Eastern Kru, whereas in Western Kru it changes into *nyìè*.

Two major forms are observable for ‘five’, namely **gbə/ gbo* and **mm* (Western).

4.4.3 ‘Six’ to ‘Nine’

It is immediately apparent that these numerals already followed the pattern ‘5+X’ in Proto-Kru. As noted above, the Seme forms are innovations.

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Table 4.94: Kru stems and patterns for ‘6’-‘9’

	‘6’	‘6’	‘7’	‘7’	‘8’	‘8’	‘8’	‘9’	‘9’	‘9’
Aizi		fɔ	fri+2				patɛ		fi	
<i>Eastern</i>										
Bakwe/Wané	5+1		5+2		5+3			5+4		
Bete/Godié	5+1		5+2		5+3			5+4		
Dida/Neyo	5+1		5+2		5+3			5+4		
Kodia	5+1		5+2		5+3			5+4		
Kuwa	5+1		5+2		5+3			5+4		
Seme		kpāā		kīi			kprɛñ		kɛl/kal	
<i>Western</i>										
Bassa	5+1		5+2		5+3			5+4		
Grebo	5+1		5+2		5+3			5+4		
Klao/Tajuasohn	5+1		5+2			4PL			10-1	
Wee	5+1		5+2		5+3			5+4		

4.4.4 ‘Ten’ and ‘Twenty’

The root *kɔgba* is attested beside the common NC root for ‘ten’ (**pu/fu*) in Eastern and Kuwa. The root for ‘twenty’ is attested as *golo* in both Eastern and Western.

4.4.5 ‘Hundred’ and ‘Thousand’

All Kru sub-groups are characterized by the lack of a primary term for ‘hundred’.

The form for ‘thousand’ in Western Kru was borrowed from the Mande languages. A primary term for ‘400’ (**dwi*) that developed in Eastern Kru served as the basis for a rare pattern for ‘thousand’ attested in these languages (**400*2+200*).

The reconstruction of the Proto-Kru numeral system is given in Table 4.95.

Table 4.95: Proto-Kru numeral system (*)

1	do, (g)bolo	7	5+2
2	so(n)	8	5+3
3	taa(n)	9	5+4
4	na	10	pu, kɔgba?
5	gbə/gbo, mm	20	golo
6	5+1	100	20*5
		1000	400*2+200

Table 4.96: Kru stems for ‘10’ and ‘20’

	‘10’	‘10’	‘20’	‘20’	‘20’
Aizi	bo		gu		
<i>Eastern</i>					
Bakwe/Wané	pò, bu?		grò, g ^o lo		
Bete/Godié		kógba	gwíó/góló		
Dida/Neyo		kógba	gló/góló		
Kodia		kógba	ǵalo		
Kuwa		kowaa		10*2	
Seme	fu				kār
<i>Western</i>					
Bassa	baɖa-bùè, puue, vu			<10	
Grebo	pu		gōrō/wlò		
Klao/Tajuasohn	pue/punn		wlòh-2		quilar-2
Wee	pue/bue		gwíó-2		kwela 2

Table 4.97: Kru stems and patterns for ‘100’ and ‘1000’

	‘100’	‘100’	‘1000’	‘1000’	‘1000’
Aizi		juyugbo			
<i>Eastern</i>					
Bakwe/Wané	20*5		400*2+20*10		
Bete/Godié	20*5		400*2+200		
Dida/Neyo	20*5		400*2+200		
Kodia					
Kuwa		kòleh?		100*10	
Seme	20*5				lit: ‘goat one’
<i>Western</i>					
Bassa	20*5				borrowed
Grebo	20*5				borrowed
Klao/Tajuasohn	20*5				borrowed
Wee	20*5				?

4.5 Kordofanian

The evidence of about twenty Kordofanian languages does not permit reconstructing the Proto-Kordofanian numeral system (assuming that Proto-Kordofanian existed). Comprehensive data for each of the four major groups is represented below (Table 4.98). Forms and patterns traceable in at least two groups are in bold. The forms are grouped within the lines in a more or less ad hoc manner, e.g. there is no special reason to believe that Talodi **lu(k)/li(k)* ‘one’ corresponds to the forms with initial **t-/t̥-** attested in other groups.

The systematic presence of the final velar **-k** in some of the terms can also be found in the Atlantic languages (especially in North Atlantic).

The term for ‘ten’ appears in numerous forms in the Kordofanian languages, which is rare. At the same time, no root for ‘ten’ is represented in at least two languages simultaneously. Moreover, nearly every language in a group has its own term for ‘ten’.

Table 4.98: Kordofanian numerals 1–5

	*Heiban	*Katla	*Rashad	*Talodi	*Kordofanian
1	kwe-(t)tɛ(k)	ʃi-ʃak	-tta	lu(k)/li(k)	ʃe(k)/lu(k)
1	ɲɔ-(t)tɔ	ʌ-ʃeen/ʃim			ʃɔ(n)
1	*-lel?			tleidi	lel/led?
2		cik/heek	(k)ko(k)		kok/kek/cik
2	-can /-ʃan, rɔm			we-ʃak/-tta	(can/ʃan, rak, rɔm)
3	tɔɾɔl/ʃeɾel	ʃʌʃ	tta	wa-ʃtak	tat/təʃ/ʃak
3	-ʃicin/-gɪtʃim	i-hwʌy			(ʃitin/ʃicin, hwʌy)
4	k(w)ɔ- ʃɔŋɔ/ma- ʃŋan/-rɪlon/- ʃɪɔ		ya-rem/wa- rɔm	-ʃandɔ	-ʃɔŋ/-ʃandɔ/- ranto/-rɔm?
4		ʌ-gʌlʌm/i- hʌlʌm		kekka	(-gʌlʌm, kekka)
5	tɔ-dini/-ðene	i-duliin			dinin/dulin?
5	ɲer-/ɲer-		*ɲer-		ɲer-/ɲer-
5		ʃɔ-gbəlɪm	wɔ-ram, ma	‘hand’-‘1’, ki-liægum	(‘hand’, ...)

Table 4.99: Kordofanian numerals >5

	*Heiban	*Katla	*Rashad	*Talodi	*Kordofanian
6	5+1	<5	nere(-r/-l/-y) (< *5+1?)	5+1	5+1
6	3+3? 3PL				(3+3)
7	5+2	5+2	5+2	5+2	< A5+2
7	4+3	3PL+1			(4+3, 3PL+1)
8	duuba(η)		dubba/tuppa		dubba
8	5+3, 4 redupl.?			5+3, 4 redupl.	5+3, 4 redupl.
8	bɔ	t̪ɔŋgɪl/t̪ɔŋɛɾɛy			(bɔ, t̪ɔŋi-)
9	10-1	10-1	10-1		10-1
9	5+4	ʃɔlbɔt̪ɪn (<5?)		5+4	5+4
10	di/di/ri	*t̪ɔɔ, ɔ-rɔ	kɔ-mən (5PL)	ma-tu(l)	?
10		rakpac, i-hedɔkun	fəŋən (fə-ŋən?)	tiəɾum, ɲipɾa, gurrɔŋ)	?
20	10*2	10*2	10+10	10*2	10*2
20	tuɾi (‘grain’), ‘big figure’			‘body’, (a-riəl, a-(na)ttu)	(‘body’, ...?)
100	20*5, < Arabic	10*10	10*10	10*10, 20*5	10*10, 20*5
1000	Arabic, 20*2*10	absent	10*10*10	ɑ-ðar	?

A primary term for ‘eight’ is distinguishable¹⁷ in the Heiban and Rashad languages.

¹⁷I used data from the following Kordofanian languages and dialects: Acheron, Dagik, Heiban, Jomang, Katla, Koalib, Lafofa, Laro, Logol, Lumun, Moro, Nding, Orig, Rere, Shirumba, Tagoi, Talodi, Tegali, Tegem, Tima, Tira, Tocho, Utoro, Warnang.

4.6 Adamawa

Adamawa is the most divergent of the NC families. The variety of numeral systems attested in the Adamawa languages confirms this statement. This can be observed not only in cases of forms that belong to different groups, but often within groups and sub-groups as well, which makes the reconstruction of its numeral system quite problematic. In other words, it is not a rare case that small Adamawa branches consisting of only a pair of languages show incomparable forms. Some examples are in order here.

Let us compare the terms from ‘one’ to ‘ten’ in the Kim branch that is commonly attributed to the Mbum-(Day) group (Greenberg 14) (Table 4.100).

Table 4.100: Numerals in the Kim branch

	Besme	Kim
1	mōndā/mbírāŋ	dú
2	tʃírí	zí
3	hāsī (hā-sī?)	tā
4	ndày	ndà
5	ndiyārá	nūwēy
6	māngùl	mènèngāl
7	dīyārā	bēálā/bēálār
8	ndā-sì (4+3?)	tīmāl/wá-zì-zí(10-2)
9	nòmīnā	lāmāđō/wá-zì-dú (10-1)
10	wàl	wòl

Only the terms for ‘four’, ‘six’, and ‘ten’ are comparable in these systems.

The Longuda language constitutes a separate branch of Waja-Jen (Greenberg 10). The table below gives an overview of the first ten numerical terms as attested in two dialects of Longuda (Table 4.101). The evidence for both dialects was collected by the same scholar (Ulrich Kleinewillinghöfer¹⁸). Morphological analysis of the forms is given according to Longurama of Koola (Longuda1) and Wala Lunguda (Longuda2).

Although we are dealing with two dialects of the same language, the roots for ‘one’, ‘two’, ‘three’, ‘six’, and ‘ten’ attested in them are different. At the same time, the terms covering the sequence from ‘six’ to ‘nine’ follow patterns com-

¹⁸<https://mpi-lingweb.shh.mpg.de/numeral/Niger-Congo-Adamawa.htm>

Table 4.101: Longuda numerals

	Longuda1	Longuda2
1	laa-twè	naa-khal
2	nàà-kwé	naaa-shir
3	nàà-tsór	naa-kwái
4	nèé-nnyìr	naa-nyìr
5	nàà-nyó	nàà-nyó
6	tsààtèn	na-khí-nà-kwái (2*3)
7	í-néé-nyìr i-nàà-tsór(4+3)	nyi-na-kwái (4+3)
8	nyíi-tìn (<4?)	nyí-thìn (<4?)
9	é-nàà-nyó í-néé-nyìr(5+4?)	nyi-na-nnyó (4+5)
10	koo	nôm

monly attested elsewhere. Thus the differences between these dialects appear to be greater than those between the languages within Mande or Bantu families. This raises the question as to whether a Proto-Kim or Proto-Longuda reconstruction is indeed relevant.

Moreover, the reconstruction is additionally hindered by the fact that numerical terms in the majority of the Adamawa languages are subject to the alignment by analogy more frequently than in other NC languages. General considerations regarding this problem can be found in Chapter 3. This is of special significance for the Adamawa languages since it affects etymological interpretations. The evidence from a number of languages belonging to the Duru sub-group of Leko-Nimbari (Greenberg 4) may serve as a case study (Table 4.102).

Table 4.102: Duru numerals

	Peere	Doyayo	Gimme	Gəunəm	Vəmnəm	Momi	Longto
1	dəə	gbúnú	wəɔna	mani	màn	muzoz	wəŋŋá
2	iro	ééré	idtigè	tək	ètèn	ittáz	sittó
3	tāāro	taare	taagè	taarək	tāán	tāáz	tāābó
4	naro	náɔ	nàagè	náárək	nānnò	náz	nabbó
5	núuno	nooné	nɔɔnigè	nɔɔnɔk	gbà náárò	gbanáá	nǔmó
6	nón-dəə	nɔɔn-gbúnú	nɔngè	nɔɔ-waŋgə	gbāā-sè māl	bāmbáz	sáame

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Matching final segments of the first few numerical terms in each of these languages are highlighted in red. I agree with Larry Hyman that “it might not be analogy, rather the use of a marker” (p.c.) but it should be noted that though these segments are different in each case (i.e. they do not match even within a pair of languages), they are present in each language under discussion.

In Mumuye-Yandang, which is another branch of Leko-Nimbari (Greenberg 5), an additional sub-morpheme (-t) is attested that is not present in Duru (Table 4.103).

Table 4.103: Analogical alignments in Mumuye-Yandang

	Mumuye	Bali	Yandang (dial.)
2	ziti	i-ye	í-nī
3	ta:ti	taat	tâ:t
4	dè:ti	naat	nâ:t

The following conclusions with regard to the Proto-Duru numeral system can be reached upon the basis of this evidence. First, the final segments (whatever their phonetic difference) should not be viewed as a hinderance to the comparison of numerical terms. This means that Momi *tàáz* ‘three’ can (and should be) compared to Longto *tāábó*. The question of whether their final segments should be analysed as morphemes or sub-morphemes is of secondary importance for our purposes. At the same time, the quality of the second consonant in Proto-Leko-Nimbari is obscure, so we have to reconstruct the form as **taaX*, where X is an unknown consonant.

As demonstrated above, numerical terms are exceptionally divergent within the family. In addition to this, systematic (diversified) alignment by analogy is often employed in the languages under study. Both factors make the reconstruction a challenging task, even though an attempt at reconstruction of the Adamawa numerals by a highly competent scholar is available (see Boyd 1989). His results, however, are of limited relevance for our comparative purposes, as the following example shows. According to Boyd, the Proto-Adamawa term for ‘one’ is to be reconstructed as **ku-di-n* (the root **di*) with **kwin* being its later development. His ideas on how this proto-form is reflected in particular branches of the Adamawa family are summarized in the table below (Table 4.104). Notations in the first column refer to Grinberg’s grouping of the Adamawa languages.

Table 4.104: **kwin*- reflexes in Adamawa according to Boyd

	*Proto	Reflexes
G1	kwin	kun
G1	kwin	kwaan
G2	kwin	gu-(a)s(a)
G4	kwin	gun, gbun, bin, wun-ga, guu
G5	kwi(t)	gbet, gorV
G5	kwin	in(d)i
G6	kwin-k	soŋ
G7	kwin	indi > fa-ndi
G8	kwin-kwin	bimbimi
G8	kwi(n)	gwi > ju
G9	kwin	tsuŋ/tsiŋ, cɔŋ
G10	kwi-t	> kwat > kal
G13	kwit	furu, gulu
G13	kwit	> kwat > bara(k)
G13	kwin	ʈoŋ
G14	kwin	ɗu
Day	kwin-k	ngoŋ
Day	kwin	(k)wan > mɔn

Even if Boyd's reconstruction of the Proto-Adamawa form is correct, a diachronic interpretation that implies an etymological relationship between *bimbimi*, *cɔŋ*, *du* and *gbet* does not fit the purpose of our integral comparative study of NC numerical terms because it can be used to justify nearly any etymological connection. In view of this, the Adamawa numerical terms will be treated in the same way as those from the preceding language families. First, the main forms of the numerical terms will be established, with no attempt at tracing them down to a provisional proto-form. Then the numeral systems of each of the Adamawa branches will be studied separately. Finally, an integral analysis of the available evidence pertaining to each of the terms will be offered. This approach will enable us to treat the Fali languages and even Laal together with the Adamawa languages, although their relationship to the latter is often questioned (in the case of Laal, doubts are raised as to whether it belongs to NC at all).

4.6.1 Fali-Yingilum (G11)

It should be noted that after a nasal, *-r-* in the Fali forms regularly corresponds to *-N-* in those of Yingilum, cf. ‘5’ Fali *kɛrɛw* ~ Yingilum *kɛr̀àw*, ‘7’ *j̀r̀ɔs* ~ Yingilum *j̀ǹàs*. An alignment by analogy is probably attested in the terms for ‘three’ and ‘four’ (**taaX* > *taan* may have changed by analogy with **naan*).

Table 4.105: Fali-Yingilum numerals

1	kpolo/bɔlo (< *lo?)	7	j̀r̀ɔs
2	cuk, gbara	8	4 redupl.
3	taan (< taaX)	9	10–1/ɲɔɔs kàm(kàn) k̀p̀òlò ‘rest hand one’
4	naan	10	ra
5	kẽrɛw	20	10*2
6	yira/yilo	100	< Fula
		1000	< Fula

4.6.2 Kam (Nyimwom, G8)

Table 4.106: Kam numerals

1	bii (Meek: bimbini) (< *b-ii?)	7	j̀ùp yi-raak (6,2 - ‘second six’?)
2	yi-raak (i-ra)	8	sâl
3	càr	9	nízaa
4	nár (< *naX)	10	bòò
5	ɲwún	20	k̀p̀áimí, *̀ǹkp̀ó
6	j̀ù:p	100	20*5
		1000	?

Within the NC context, a reversive alignment by analogy may be considered: **naX* ‘4’ > *nar* by analogy with **car* ‘3’. As Boyd rightfully observes, in the case of ‘one’ it is often unclear whether the initial consonant is a part of the root, or a reflex of the noun class prefix.

The term for ‘seven’ simulates the pattern ‘7=6+2’ (this phenomenon is not infrequent in NC). Sometimes (e.g. in some of the Mande languages) this impression is due to the fact that the term for ‘six’ originally derived from ‘5+’. Over

time, an innovation replaced the original term for ‘five’, which was only preserved in the derived term for ‘six’. Alternatively, the term for ‘seven’ could be explained as ‘the other six’ (or ‘a big six’ in some languages), as perhaps in Kam, assuming that *jù:p* does not go back to the term for ‘five’.

4.6.3 Leko-Duru-Mumuye (G4, G2, G5)

This group is often labeled Leko-Nimbari. Here we follow Raimund Kastenholtz and Ulrich Kleinewillinghöfer, who note that “The term ‘Nimbari’ should not to be used as a classificatory term, nor should the scarce and surely in large parts erroneous data be given central significance in any comparative approach to Adamawa languages” (Kastenholtz & Kleinewillinghöfer 2012).

4.6.3.1 Duru (G4)

Table 4.107: Duru numerals

1	dáə, gbúnú, wó-ŋŋá/wɔɔna/dá(ŋ)gá/*nge, man(i)/*mal	7	5+2, (gútambe, 6+’odd’, dámsàrà, 4+3)
2	du/ru/to, te/re	8	4PL/4+4, 5+3, (< Hausa)
3	tãátó/tããro	9	‘one finger is left’, níŋsínè, 5+4, 10-1
4	nató/naró (< *naX)	10	bōʔ, kob/kop/fób
5	núno/nɔɔnì, gbà náárò/gbanáá, sáá	20	gbeg/gbàhsí (=’staff’), *wóóg (‘head’), zul/zur (‘head’), (10*2, ráárò, jùgúyɔ),
6	gúú, 5+1	100	temere < Fula, 20*5
		1000	uzinere < Fula, (dukə)

This table provides an overview of forms and patterns attested in eleven sources for this sub-group. This degree of variety is not normally attested within a single sub-group, which raises doubts as to whether these languages should be grouped together.

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4.6.3.2 Leko (G2)

Our study of this sub-group is based on the evidence of two languages. The summary table above is not descriptive of the language-specific mechanisms of the alignment by analogy. An overview of the numerical terms covering the sequence from ‘two’ to ‘five’ by language is provided in Table 4.109.

Table 4.108: Leko numerals

1	níŋa/nííá (<ŋa?)	7	5+2
2	nnú, ra?, *-i?	8	5+3, < Hausa
3	toorà/toonú	9	5+4, ‘one is left’
4	naarà/nεεr-əb	10	kób/kóp
5	núúnà/núnn-ub	20	nɛd níi gbɛd, laa-1
6	nôŋgôŋs/núŋgôŋs	100	20*5, < Fula
		1000	20*10?, < Fula

Table 4.109: Analogical alignments in two Leko languages

	Kolbila (Zurá)	Samba Leko
2	innú	iirà
3	toonú	toorà
4	nεεrəb	naarà
5	núnnub	núúnà

Apparently, the terms from ‘three’ to ‘five’ in these two languages are related to each other. At the same time, two groups of terms (‘2–3’ and ‘3–4’) with an alignment by the ultima are observable in Kolbila. This is applicable to a group of Samba Leko terms as well, namely ‘2–4’ (possibly also ‘5’; the fact that the Samba Leko terms are adjusted by both the vowel quality and the tone is noteworthy). This means that the seemingly unrelated roots for ‘two’ may have derived from a common etymon (still unknown to us) by means of alignment by analogy. The source form of ‘two’ remains obscure. Assuming that it was similar to the one reconstructed for the Duru sub-group (e.g. *ru), it is likely that the same form is to be reconstructed for Leko as well: *ru > Kolbila nu by analogy with toonu ‘3’; *ru > Samba Leko rà by analogy with toorà ‘3’. However, the evidence in favor of this reconstruction is inconclusive. Alternatively, the initial vowel of the term for

‘two’ (*ii-/in-) may reflect the source root, while the final segment is potentially explained via an alignment by analogy with ‘3’.

4.6.3.3 Mumuye-Yandang (G5)

Table 4.110: Numerals in Mumuye-Yandang

1	bīntī/ḃini (* < nti/ni?) , gbétè	7	5+2
2	ziti, ye, nī	8	5+3
3	taat	9	5+4
4	naat	10	kop/kob
5	mă:ni, nɔng/ghinān	20	mba-1, kar-1, mim-1
6	5+1	100	20*5
		1000	derived

This sub-group is represented by three languages that show different forms of ‘two’. The terms for ‘three’ and ‘four’ are adjusted by analogy. Studying them in a wider NC context reveals that the final consonant in ‘four’ was adjusted by analogy with ‘three’. The alignment itself must have occurred already at the Proto-Mumue-Yandang level, which explains our provisional reconstructions suggested for this proto-language in the table above.

No evidence pertaining to the Nimbari numerals is available to us. The forms of ‘one’ given by Boyd (Boyd 1989) are noteworthy (Nimbari (*n*)yeme/ geme/ (zeme?)).

4.6.4 Mbum-Day (G13, G14, G6, Day)

4.6.4.1 Bua (G13)

This is very divergent branch that has been poorly documented. I’d like to thank Pascal Boyeldieu who has provided me with his personal data on Ba (Bua) and Lua (Niellim), as well as some other rare sources. The main forms and patterns are shown in Table 4.111.

Numerals in the Bua group can be presented as follows (Table 4.112)

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Table 4.111: Bua numerals

	Fanya Niellim	Tunya Bua	Zan Gula	Kulaal	Bolgo	Koke	
1 do/lo	búdū/ būrū	sèli	gúlu	sammā, saado	ṭóŋ	ba(k)ra, silla	barak
2 i-ru/ li-ru	ndīdí/ ndīrí	à-rī	i-li/i-rī:	ris:i/lissi	ròk	lèti, retè	lèdi
3 taro	tērí	à-tā	í-tēr	to:ri	tòòs	teri	tēri
4 nagi/ naro	niā:ní/ néni	à-nā	í-pāw/ paō	na:sɪ	nòrò	har	hār
5 lugni	lùní	à-lōnī	í-lwār	te(r)	lúp	tisso	tisó
6 kaba	tár	nānò	tār	5+1	lú-én-ṭóŋ	tipsi	dípsil
7 5+2	longa	lúlú	lūr	5+2	lú-é-ròk	5+2	tiglén
8 <4	3+4, <Bagirmi	kòntā	<*4 PL?	5+3		orhor (4 redupl.), 5+3	4 redupl.
9 10-X	<Bagirmi	à-tī	lór-lor	5+4	sàkólínnòrò	diar, 6+3	jār
10 teba	<Bagirmi, hulóa	kùtù	húlil/ lor-poo	filo:le/ filori	yíppà	do(k)	dog
20 10*2	doksap	10*2	<10PL	ɔ-fa:lɛ		a-rep, a-hun, tehu	
100	ro/ru	à-rū	a-ru	< Arabic	míà/míè		ae léd
1000	dubu	dūbú	dubu	< Arabic	hálif		ae har

Table 4.112: Bua numerals (summarized)

1	*do, *de?, bara(k), (ṭóŋ)	7	5+2, 3+4, lúlú/lòŋg5/lur, (tiglen)
2	*di, *ri?, *ru?, (ròk), (rete)	8	4 redupl., 5+3
3	tar/tori/teri	9	ti, jar, 5+4, 10-X
4	na/nagi/niani, har	10	do(k), (kùtù), (filo:le), (yíppà), (teba)
5	luni/loni/*lu,te(r), *kɔn?, (tiso)	20	10*2, do-ksap, fa:lɛ, (a-rep), (a-hun)
6	5+1, tár, (nānò), (kaba), tipsi	100	ro/ru
		1000	< Bagirmi

4.6.4.2 Kim (G14)

The first ten terms of Besme and Kim are given in the table above (Table 4.100). The term for ‘twenty’ in these languages follows the pattern ‘10*2’, whereas the Kim term for ‘hundred’ is borrowed from Arabic. The Besme term for ‘hundred’ is borrowed from the French *sac* ‘sack’, whereas the term for ‘thousand’ is borrowed from Bagirmi.

4.6.4.3 Mbum (G6)

Table 4.113: Mbum numerals

1	mbew/mbiew, bõõŋ/búónó/bóm/vaŋno	7	10–3, rɪŋ, (rĕnām, tàrnáǵà)
2	seǵe/sere, gwa/bǝ-gĕ, bǝ-ti	8	10–2, nama/namma/nĕnmàʔǝ
3	say	9	10–1, doraŋ
4	nɪŋ, nai	10	boo, dzama/dzĕmà, (dùc, hù-wàlĕ)
5	ndĩbi/ndĕbĕ/dūwĕe/dápì	20	10*2, ‘2 hands’, 10+10
6	ze(y)/ye(a), (tótókló, bì-gírò)	100	sóǵ/sǝt, < Fula, < Arabic
		1000	‘sac’, bag’, < Fula, < Bagirmi

This sub-group is represented by a dozen languages. Unlike Leko-Duru-Mumue no alignment by analogy is attested. Some forms of ‘two’ are of unclear morphological structure.

4.6.4.4 Day

Table 4.114: Day numerals

1	ngǝǵ, *mon	7	4+3
2	dǵí	8	4 redupl.?
3	tà	9	‘lacking one’
4	ndà, *bī-yām	10	mò
5	sĕri	20	10*2
6	5+1	100	tù
		1000	< Bagirmi

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This branch is comprised of an isolated language. Its attribution to Mbum-Day has been a subject of scholarly debate. The form **mon* ‘1’ is postulated on the basis of *sēri mōn* ‘six’, whereas the reconstruction of **bīyām* (**bī-yām?*) ‘4’ is based on *bīyām tà* ‘seven’.

4.6.5 Waja-Jen (G9, G10, G1, G7)

4.6.5.1 Jen (G9)

Table 4.115: Jen numerals

1	kwín/*fín/tsing	7	5+2
2	ráb/*re, bwə-ng, bwa-yung	8	4PL, 5+3
3	gbunuŋ, bwa-tə	9	5+4
4	net, bwa-nyə	10	fóób, bwa-hywə
5	nóob/*na, bwa-hmə/*hwĩ	20	fa-1, ngwu-1
6	5+1	100	20*5
		1000	fik-1, 20-fe

This branch is represented by two languages: Burak and Jenjo (Dza). The evidence from this group is among Boyd’s best arguments for the reconstruction of **kwin* (< **ku-di-n*) ‘one’. The primary term *li* (*bwa-li*) ‘fifteen’ is attested in Jenjo. Accordingly, the term for ‘sixteen’ follows the pattern ‘15+1’ (*bwali ji tsing*). Interestingly, in Burak the term for ‘hundred’ is *li* (*li kwín*).

The form **hwĩ* ‘five’ is traceable in Jenjo compound terms covering the sequence from ‘six’ to ‘nine’ (*hwĩ-tsing* ‘six’, *hwĩ-yung* ‘seven’, etc.) as is the corresponding Burak form **na* ‘five’ (*naa-fín* ‘six’, *náá-re* ‘seven’, *ná-tát* ‘eight’). The form **re* ‘two’ is observable in *náá-re* ‘seven’, whereas **fín* ‘one’ is traceable in *naa-fín* ‘six’.

4.6.5.2 Longuda (G10)

The evidence for the first ten numerals in two Longuda dialects can be found in the table above (Table 4.101). The term for ‘twenty’ in these languages follows the pattern ‘10*2’. The forms of ‘hundred’ are *pùlò(wé)/phulewe*.

Table 4.116: Waja numerals

1	w-in/d-in/kw-an/g-εen/*k-un?	7	ni-bir/ni-ber/ni-bil/ni-bi(y)
2	yó-rób/rɔɔp/yob/yo, (su)	8	na-rib/na-lib/na-rub (4*2)
3	taat, kunuŋ, (bwanbí)	9	10-1, teer/teet/tɔɔɔ
4	naat, (gwár)	10	kób/kub/kwab/kpop/kwu
5	nu(ŋ), (fwá:d)	20	10*2, '2 hands'
6	nu-kun (<5+1?)	100	<10?, wɔn, (bwa-tige)
		1000	kɔɔl, nèe/kú-nèŋ, 100*10, bi-kate, tedu

4.6.5.3 Waja (G1)

Some languages in this sub-group are characterized by a sub-morphological alignment of the terms for 'three' and 'four' well-attested in Adamawa: Dadiya *tal* '3' ~ *nal* '4', Bangunji (dial.) 1 *táát* '3' ~ *náát* '4', Bangunji (dial.) 2 *taar* '3' ~ *naar* '4', Tula (Kitule) *jí-t:à* '3' ~ *jà:-nà* '4'. As a result, these terms are treated as minimal contrastive pairs in the paradigm. Within the NC context, forms with the final *-t* should be considered prototypical in the case of both terms. This means that **naaX* 'four' (final consonant unknown) may have evolved into **naat* by analogy with 'three' in Proto-Waja. Later, an innovative form for 'three' developed in Awak and Waja: Awak *kunúŋ*, Waja *kunuŋ*. The Dijim-Bwilim *bwanbí* is apparently an innovation.

Interestingly, the forms for 'six' attested throughout the sub-group resemble the Awak and Waja forms for 'three'. However, the forms for 'six' can be explained as '5+1' (assuming that they include an allomorph of **kun* 'one').

4.6.5.4 Yungur (G7)

The terms for 'twenty', 'hundred' and 'thousand' are attested in only one source (Kaan (Libo)) out of the eight sources available for this branch, hence they are quoted in brackets. Morphological analysis of the terms for 'one' and 'two' is unclear: **fV* may be a reflex of the original noun class prefix.

4.6.6 Laal

Finally, let us turn to the Laal numeral system. Laal's attribution to the Adamawa languages (as well as its attribution to NC) is debatable. Today it is assumed that

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Table 4.117: Yungur numerals

1	fini/fandi/pǎndǎŋ (< *ndi?), wunú	7	nbutu
2	raap, fətə/fiici (< *tə/ci?)	8	4 redupl.
3	táákón/(taarǎn)	9	5+4
4	kurun	10	bú(u), (kutun)
5	wonon/wonun	20	(10*2)
6	mindike	100	(-ru)
		1000	(100*10)

it is an isolated case within Niger-Congo. Comparative study of its numerical terms may shed light on its genealogical relationship (Table 4.118).

Table 4.118: Numerals in Laal

1	b̀̀d̀̀í́l (b̀̀í-d̀̀í́l?)	7	5+2
2	ʔísɪ (ʔí-sɪ?)	8	4 redupl.
3	māā	9	yàŋjáj
4	b̀̀sān (b̀̀í-sān?)	10	tūū
5	sāb, *swa-	20	10*2
6	cìcààn	100	10-'big'
		1000	< Baguirmi < Hausa

As in many other NC languages, the major problem with Laal numerals is the obscurity of their morphological structure. Pascal Boyeldieu established that traces of noun class suffixes are observable in Laal forms as their comparison to SG and PL forms show (see Boyeldieu 1982). However, as I tried to demonstrate elsewhere (Pozdniakov 2010), some traces of noun class prefixes had been preserved in this language as well. At this point, it seems reasonable to set the alternative variants aside for further comparison.

What follows is an attempt to synthesize the Adamawa evidence.

4.6.7 Proto-Adamawa

4.6.7.1 'One'

The main forms are given in Table 4.119.

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In accordance with Boyd's hypotheses discussed above, the forms in the first two columns may be related in view of the reconstruction of the root **di* (possibly also **-in*), the noun class prefix **ku-* and the suffix **-n* (**ku-di-n* '1')

The last column lists forms that are attested in one of the branches only. The roots that can be tentatively reconstructed as **do*, **nga/ngɔ*; **(g)bunuand* and **mon* are noteworthy.

4.6.7.2 'Two'

The main forms of this root are quoted in Table 4.121. The grouping of forms is admittedly not substantiated enough. The variety of forms within this family is striking, even when unrestricted phonetic grouping is applied.

4.6.7.3 'Three'

Comparative evidence for this root points to its reconstruction as **taat* (with further alignment by analogy within each of the branches). As in the other NC families, the root is exceptionally stable, in contrast to the roots for 'one' and 'two' that demonstrate a wide variety of forms. A shared innovation in Jen and Waja (attested in Burak, Awak and Waja) is noteworthy.

Table 4.120: Adamawa stems for '3'

Fali-Yingilum	taan (< taaX)		
Kam	cār		
<i>Leko-Duru-Mumuye</i>			
Duru	tāātó/tāāro		
Leko	toorà/toonú		
Mumuye	taat		
<i>Mbum-Day</i>			
Bua	tar/tori/teri		
Kim	tā		hāsī
Mbum	say		
Day	tà		
<i>Waja-Jen</i>			
Jen	bwa-tə	gbunuŋ	
Longuda	tsér		kwái
Waja	taat (bwanbí)	kunuŋ	
Yungur	táákón/(taarén)		
Laal			māā

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4.6.7.4 ‘Four’

Table 4.122: Adamawa stems for ‘4’

Fali-Yingilum	naan			
Kam	nár			
	(< *naX)			
<i>Leko-Duru-Mumuye</i>				
Duru	nató/naró			
	(< *naX)			
Leko	naarà/nɛɛr-əb			
Mumuye	naat			
<i>Mbum-Day</i>				
Bua	na/nagi/niani		har	
Kim			ndà(y)	
Mbum	nai	nìŋ		
Day			ndà	*bī-yām
<i>Waja-ʃen</i>				
Jen	net	bwa-nyə		
Longuda	nnyìr/nyìr			
Waja	naat		gwár	
Yungur				kurun
Laal				ḃīsān
				(ḃī-sān?)

The main NC form *naX is predominant here, its second consonant being subject to alignment by analogy. The same root is likely to be reconstructed at the Proto-Adamawa level as well.

4.6.7.5 ‘Five’

The main root (*nun*) may be the same as in the Gur languages and may be etymologically related to the term for ‘hand’. It is likely that the isolated forms quoted in the rightmost column go back to similar terms as well. The Jen root *hmə* could be a borrowing from Chadian Arabic: *xamsa* ‘5’. The Mbum forms *ndēbē/ dūwēe* may be influenced by Fula (*jowi* ‘five’).

Table 4.123: Adamawa stems for ‘5’

Fali-Yingilum		kēřew	
Kam	ŋwún		
<i>Leko-Duru-Mumuye</i>			
Duru	núno/ nɔɔnì,		gbà náárò/ gbanáá, sáá
Leko	núúnà/ núnn-ub		
Mumuye	nɔng/ ghinān		mă:ni
<i>Mbum-Day</i>			
Bua			luni/loni/ *lu,tɛ(r), *kɔn?, (tiso)
Kim Mbum	nūwēy		ndiyārá ndifí/ dūwēe/ dápì
Day			sēřì
<i>Waja-Jen</i>			
Jen	nóob/*na	-hmə/*hwī	
Longuda	nyó		
Waja	nu(ŋ)		fwá:d
Yungur	wo- non/wo- nun		
Laal			sāb, *swa-

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4.6.7.6 ‘Six’

Table 4.124: Adamawa stems and patterns for ‘6’

Fali-Yingilum			yira/yilo
Kam		jù:p	
<i>Leko-Duru-Mumuye</i>			
Duru	5+1	gúú	
Leko			nôŋgôʒ/núŋgôʒ
Mumuye	5+1		
<i>Mbum-Day</i>			
Bua	5+1		tá:r, (nānò), (kaba), tipsi
Kim			māngùl/mènèngāl
Mbum			ze(y)/ye(a), tótókló, bì-gíró
Day	5+1		
<i>Waja-Jen</i>			
Jen	5+1		
Longuda		tsààtòn	2*3?
Waja	nu-kun (<5+1?)		
Yungur			mindike
Laal		cicààn	

The most frequently attested pattern is ‘5+1’. However, there is a great variety of isolated forms (see the last column). The similarity between the Laal and Longuda forms is noteworthy; both may go back to Chadian Arabic *sit:e* ‘six’. The Kim (and also Yungur?) form could be a borrowing from Bagirmi (*miká* ‘6’).

4.6.7.7 ‘Seven’

Table 4.125: Adamawa stems and patterns for ‘7’

Fali-Yingilum					jɔ̃rɔs
Kam				‘second six’	
<i>Leko-Duru-Mumuye</i>					
Duru	5+2	4+3	6+’odd’		gútambe, dámsàrà
Leko	5+2				
Mumuye	5+2				
<i>Mbum-Day</i>					
Bua	5+2	3+4			lúlú/lòngɔ̃/ lur, (tiglen)
Kim				béálá/béálār	đīyārā
Mbum					10–3, rɪŋ, rēnām, tārńáǵà
Day		4+3			
<i>Waja-Jen</i>					
Jen	5+2				
Longuda		4+3			
Waja				ni-bir/-bil/ -bi(y)	
Yungur					nbutu
Laal	5+2				

As in the case of ‘six’, the predominant pattern (‘5+2’) for ‘seven’ is rather plain. It co-exists with a variety of isolated forms of uncertain etymology.

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4.6.7.8 ‘Eight’

Table 4.126: Adamawa stems and patterns for ‘8’

Fali-Yingilum	4 redupl.				
Kam				sâl	
<i>Leko-Duru-Mumuye</i>					
Duru	4PL/4+4	5+3		< Hausa	
Leko		5+3		< Hausa	
Mumuye		5+3			
<i>Mbum-Day</i>					
Bua	4 redupl.	5+3			
Kim	ndâsi (4PL?)		wázìzì (10–2)	tīmāl	
Mbum			10–2	nam(m)a/ mà?ä	nèn-
Day	4 redupl.?				
<i>Waja-ʃen</i>					
Jen	4PL	5+3			
Longuda				nyíthìn	
Waja	4*2				
Yungur	4 redupl.				
Laal	4 redupl.				

The pattern ‘8=4 redupl.’ is to be reconstructed at the Proto-Adamawa level.

4.6.7.9 ‘Nine’

Table 4.127: Adamawa stems and patterns for ‘9’

Fali-Yingilum		10-1/ηgΔs kàm(kàn) kpòlò ‘rest hand one’	
Kam			níízaa
<i>Leko-Duru-Mumuye</i>			
Duru		‘one finger is left’, níìjsínè, 5+4, 10-1	
Leko	5+4	‘one is left’	
Mumuye-Yandang	5+4		
<i>Mbum-Day</i>			
Bua	5+4	10-X	ti, jar
Kim		10-1	nòmīnā
Mbum		10-1	doraŋ
Day		‘lacking one’	
<i>Waja-Jen</i>			
Jen	5+4		
Longuda	5+4		
Waja		10-1	teer/teet
Yungur	5+4		
Laal			yànjáŋ

A primary term for ‘nine’ was apparently non-existent in Proto-Adamawa. A comparison between Bua *diar* and Kanuri *lɔyár* may be suggestive if a borrowing is considered. The same applies to the terms for ‘nine’ in Waja (*tɔɔɔ*) and Hausa (*tara*).

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4.6.7.10 ‘Ten’

Two alternative roots for ‘ten’ (Table 4.128) are distinguishable (**boo* and **kob* attested in four and two groups respectively). The root *d(u)o* is observable in two Mbum-Day sub-groups. Finally, the root *kutu(n)* is found in two languages, namely in Tunya (Bua) and Kaan (Yungur). Assuming that *ku-* is a class prefix, this root may prove to be related to *tūū* (Laal).

Table 4.128: Adamawa stems for ‘10’

Fali-Yingilum					ra
Kam	bóò				
<i>Leko-Duru-Mumuye</i>					
Duru	bōʔ,	kob/kop/ fób			
Leko		kób/kóp			
Mumuye		kop/kob			
<i>Mbum-Day</i>					
Bua			do(k)	kùtù	(filo:le), (yíppà), (teba)
Kim				wàl/ wòl/ wàr/ *wèy	
Mbum	boo		dùɔ	hù-wàlě	dzama/ dzémà
Day	mò				
<i>Waja-Jen</i>					
Jen		ʃóób			bwa- hywə nôm
Longuda		koo/kù			
Waja		kób/kub/ kwab/ kpop/ kwu			
Yungur	bú(u)			kutun	
Laal				tūū	

4.6.7.11 ‘Twenty’

The term for ‘twenty’ (Table 4.129) in the Duru languages either follows the pattern ‘20=10*2’ or goes back to the lexical roots for ‘head’ and ‘staff’. The Niellim term *do-ksap* was likely borrowed from Bagirmi *dùg sap* ‘twenty’.

Table 4.129: Adamawa stems and patterns for ‘20’

Fali-Yingilum	10*2		
Kam			*̀̀̀kpó, kpáímí
<i>Leko-Duru-Mumuye</i>			
Duru	10*2	gbeg/ gbàhsí (‘staff’), *wóóg (‘head’), zul/zur (‘head’)	ráárò, jùgúyò
Leko		laa-1	nèd níi gbèd
Mumuye			mba-1, kar-1, mim-1
<i>Mbum-Day</i>			
Bua	10*2	fa:lè	do-ksap, a-rep, a-hun
Kim	10*2		
Mbum	10*2	‘2 hands’, 10+10	
Day	10*2		
<i>Waja-Jen</i>			
Jen		fa-1	ngwu-1
Longuda	10*2		
Waja	10*2	‘2 hands’	
Yungur	10*2		
Laal	10*2		

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4.6.7.12 ‘Hundred’

Table 4.130: Adamawa stems and patterns for ‘100’

Fali-Yingilum			< Fula
Kam	20*5		
Leko-Duru-Mumuye			
Duru	20*5		< Fula
Leko	20*5		< Fula
Mumuye	20*5		
Mbum-Day			
Bua		ro/ru	
Kim			< Arabic
Mbum		sóɗ/sɔt	< Fula, < Arabic
Day		tù	
Waja-Jen			
Jen	20*5		
Longuda			pùlò(wé)/phulewé
Waja	<10?		wɔn, bwa-tigɛ
Yungur		(-ru)	
Laal	10-’big’		

The fact that this term was massively borrowed (most likely simultaneously) from Fula and Arabic suggests that it was lacking in Proto-Adamawa. It can be assumed that the root *ru* attested in Bua and Yungur is also a borrowing, this time from Bagirmi *àrú* ‘hundred’.

4.6.7.13 ‘Thousand’

Table 4.131: Adamawa stems and patterns for ‘1000’

Fali-Yingilum		< Fula
Kam	?	
Leko-Duru-Mumuye		
Duru		< Fula, < Hausa
Leko	20*10?	< Fula
Mumuye	?	
Mbum-Day		
Bua		< Bagirmi
Kim		< Bagirmi
Mbum	‘sack’, bag’	< Fula, < Bagirmi
Day		< Bagirmi
Waja-Jen		
Jen	ʃik-1, 20-fe	
Longuda	?	
Waja	kɔʋl, nèe/kú-néj, 100*10, bi-kate, tedu	
Yungur	(100*10)	
Laal		< Bagirmi, < Hausa

The term for ‘thousand’ was massively borrowed from Fula, Bagirmi and Hausa, which points to its absence in the proto-language.

4.7 Ubangi

What follows is a preliminary analysis of the evidence of five separate language groups including Ubangi-Banda, Gbaya-Manza-Ngbaka, Ngbandi, Sere-Ngbaka-Mba (A. Ngbaka-Mba, B.Sere), and Zande.

4.7.1 Banda

The form *gba* ‘ten’ is traceable in the Mbanza (Mabandja) terms for tens.

Table 4.132: Numerals in Banda

1	bàlē (bà-lē?)	7	5+2
2	bijī (bi-ji?)	8	5+3, ngebedede
3	vɔ-ta	9	5+4, 8+1
4	và-nā	10	mó-rófō, bu-fu, ‘two hands’, ‘all the fingers’, *gba
5	mī-ndū	20	‘one person’, ‘the whole person’, ‘body-person-all’
6	5+1, gazala	100	ngàmbò/ngbàngbò, ‘five persons’, < Sango, < Lingala?
		1000	< French ‘sack’, < Lingala?

4.7.2 Gbaya-Manza-Ngbaka

Table 4.133: Numerals in Gbaya-Manza-Ngbaka

1	*kpók/kpóm ;ndán	7	*5+2
2	*bùà, *[íitò; bùwá (bù-wá?)/vàχ, -too	8	*5+3; 4PL
3	*tār(à)	9	*5+4;kùsì
4	*nár(á)	10	*bú/bú-kǔ
5	*mòrò/mòr-kǔ	20	*10*2
6	*5+1, (gàzèlè)	100	*góm-màá ; < Lingala
		1000	< French ‘sack’, < Lingala

Ives Moñino’s reconstructions (Moñino 1995) are quoted in the table under an asterisk. Selected noteworthy forms are also included.

In the diachronical perspective, the forms *[íitò and *bùà ‘two’ probably included noun class prefixes. They go back to *-too and *-wa respectively (cf. *vàχ* ‘2’ in Gbaya Mbodomo).

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4.7.4 Sere-Ngbaka-Mba

Since the languages within this group are extremely divergent, it seems reasonable to treat the evidence from its two major sub-groups separately.

Ngbaka-Mba (Table 4.135)

Table 4.135: Numerals in Ngbaka-Mba

1	kpó-/kpáà-, ɓa-wi, ɓī-nì/bì-rì, ú-ma	7	5+2, (mā-nānikà, lè-rèzi, zyálá, sábá), sílānā/sélēnā/ǰiēnā (<4?)
2	bǰf-ì/bǰ-sī, ɓi-né/bí-de, gbwò	8	sénā (2*4?), gba-dzena/ mā-dzénà, (5+3, 10-2)
3	ba-ta/ba-la	9	5+4, 10-1, (me-newá)
4	ba-na/ba-ɗa/ba-la	10	nzò kpā('head-hand')/àngbà, a-busa
5	bu-ruwe/bu-luve/θuwe, ʔeve/ve/vue	20	10*2
6	ǰí-tà/si-ta (2*3), mā-ɗǰà/ká-zyá, 5+1	100	< Sango, < Lingala, 20*5, (mya, kúló, kpode, ngūndāngū)
		1000	gyu, kutu, < Arabic, < French (‘sack’), 100*10

Sere (Table 4.136)

Table 4.136: Numerals in Sere

1	nǰēe	7	5+2
2	so	8	5+3
3	táʔò	9	5+4
4	nàʔò	10	ɓǰ-kürü , muʔbì (‘on hands’)
5	vo	20	‘kill-person-one’
6	5+1	100	‘kill-persons-five’, < Arabic
		1000	100*10

Sere-Ngbaka-Mba (Table 4.137)

Table 4.137: Sere-Ngbaka-Mba numeral system (*)

1	kí-lī, sa	7	5+2
2	ī-jō/ī-yō/úé	8	5+3
3	bíá-tá/ā-tā	9	5+4
4	lu, bià-ngì ~ bià-mà	10	ᵛgbᵛ/bà-wē
5	ì-sìbē/bī-sùè	20	‘people one’
6	5+1	100	ndᵛᵛgbᵛ, ngbàngbù < Sango
		1000	sáki/sākè (< Sango < French)

4.7.5 Proto-Ubangi

The evidence pertaining to each of the numerical terms is summarized below.

4.7.5.1 ‘One’

Table 4.138: Ubangi stems for ‘1’

Banda	bàlē (bà-lē?)		
Gbaya-Manza-Ngbaka		kpó(k)/ (kpém)	ndán
Ngbandi		kɔ(i)	
Sere-Ngbaka-Mba			
Ngbaka-Mba	bī-nì/bì- rì	kpó-/ kpáà-	ba-wiú-ma
Sere			njēe
Zande	kí-lī		sa

Two competing roots (**le/ne* and **k(p)o(k)*) are distinguishable here.

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4.7.5.2 ‘Two’

Table 4.139: Ubangi stems for ‘2’

Banda	bifi (bi-fi?)		
Gbaya-Manza-Ngbaka		bùwá (bù-wá?)/vàχ	-too
Ngbandi	sɛ		
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba	bī-fi/bī-sī	gbwò	bi-né/bí-de
Sere			so
Zande			ī-jō/ī-yō/úé

The only root widely attested within this family is *si/fi.

4.7.5.3 ‘Three’ and ‘four’

Table 4.140: Ubangi stems for ‘3’ and ‘4’

	‘3’	‘4’	‘4’
Banda	vɔ-ta	và-nā	
Gbaya-Manza-Ngbaka	tààr	náár	
Ngbandi	ta		siɔ/syɔ
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba	ba-ta/ba-la	ba-na/ba-ɗa/ba-la	
Sere	táʔò	nàʔò	
Zande	bíá-tá/ā-tā		lu, bià-ngì ~ bià-mà

The roots for ‘three’ and ‘four’ can be securely reconstructed as *taar and *naar respectively (with an alignment by analogy applied).

4.7.5.4 ‘Five’

Table 4.141: Ubangi stems for ‘5’

Banda	mī-ndū		
Gbaya-Manza-Ngbaka		m̀r-(k)́	
Ngbandi		k̄/k̄̄	
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba	bu-ruwe/-luve/θuwe		ʔeve ~ ve/vue
Sere			vo
Zande			ì-sìbē/bī-sùè

The Proto-Ubangi form is unclear, since the term for ‘five’ is based on the lexical root meaning ‘hand’ (**kɔ*) in two groups out of five. The only root whose attestations are not limited to a single group is **du(w)/lu(w)*.

4.7.5.5 ‘Six’

Table 4.142: Ubangi stems and patterns for ‘6’

Banda	5+1	ga-zala	
Gbaya-Manza-Ngbaka	5+1	gà-zèlè	
Ngbandi			ma-na, mè-rē
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba	5+1	mā-đià/ká-zyá	ǰí-tà/si-ta (2*3)
Sere	5+1		
Zande	5+1		

In addition to forms that follow the common pattern ‘6=5+1’, a number of other forms of uncertain etymology are attested in the first two groups (and possibly in Sere-Ngbaka-Mba as well, assuming that our morphological analysis of pertinent forms is correct).

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4.7.5.6 ‘Seven’

Table 4.143: Ubangi stems and patterns for ‘7’

Banda	5+2	
Gbaya-Manza-Ngbaka	5+2	
Ngbandi		mbara-mbara
<i>Sere-Ngbaka-Mba</i>		
Ngbaka-Mba	5+2	mā-nānìkà, lè-røzi, zyálá, sábá, sílànā/sélènā/ǰiēnā (<4?)
Sere	5+2	
Zande	5+2	

The variety of forms attested in Ngbaka-Mba is noteworthy.

4.7.5.7 ‘Eight’

Table 4.144: Ubangi stems and patterns for ‘8’

Banda	5+3		ngebedede
Gbaya-Manza-Ngbaka	5+3	4PL	
Ngbandi			miambe/myòmbè
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba	5+3	sénā (2*4?)	ǰba-dzena/mā-dzénà, 10–2
Sere	5+3		
Zande	5+3		

4.7.5.8 ‘Nine’

Apparently, at the family level the common pattern ‘5+’ should be assumed for the terms from ‘six’ to ‘nine’. Isolated forms attested in groups and sub-groups are quoted here (as well as in the cases of other families) in order to collect exhaustive evidence for further etymological analysis. Moreover, a small chance that the Niger-Congo proto-form is traceable within only a single branch should not be ignored.

Table 4.145: Ubangi stems and patterns for ‘9’

Banda	5+4	8+1
Gbaya-Manza-Ngbaka	5+4	kùsì
Ngbandi		gumbaya
<i>Sere-Ngbaka-Mba</i>		
Ngbaka-Mba	5+4	10–1, (me-newá)
Sere	5+4	
Zande	5+4	

4.7.5.9 ‘Ten’

Table 4.146: Ubangi stems for ‘10’

Banda	bu-fu	*gba	mó-rófō, ‘two hands’, ‘all the fingers’
Gbaya-Manza-Ngbaka	‘personne’ (‘joindre les mains’)		
Ngbandi			sui, bàlé
<i>Sere-Ngbaka-Mba</i>			
Ngbaka-Mba		nzò-kpā ‘head’- ‘hand’)/à-ngbà	a-busa
Sere			ḃĩ-kürü, ‘on hands’
Zande		ḡgbḡ/bà-wē	

The reconstruction of the term for ‘ten’ is so problematic that it raises doubts as to whether it was present in Proto-Ubangi at all. In view of the convincing internal etymology suggested by Ives Moñino, the root **bu* alternating with **pu* and **fu* in some of the NC families is an unlikely candidate. The reconstruction of **gba/ kpa* is worth considering. However, the root may not be primary.

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4.7.5.10 ‘Twenty’

Table 4.147: Ubangi stems and patterns for ‘20’

Banda	‘one person’, ‘the whole person’, ‘body-person-all’	
Gbaya-Manza-Ngbaka		10*2
Ngbandi		10*2
<i>Sere-Ngbaka-Mba</i>		
Ngbaka-Mba		10*2
Sere	‘kill-person-one’	
Zande	‘people one’	

Two reconstruction possibilities are available here, i.e. the pattern ‘20=10*2’ commonly attested in NC, and a derivation from the lexical term meaning ‘person’.

4.7.5.11 ‘Hundred’

Table 4.148: Ubangi stems and patterns for ‘100’

Banda	ngàmbò/ngbàngbò	‘five persons’ < Sango, < Bangala (< Lingala?)
Gbaya-Manza-Ngbaka		‘cut/gathered’-‘things’? ‘clap hands’?, < Lingala
Ngbandi	ngbangbo	
<i>Sere-Ngbaka-Mba</i>		
Ngbaka-Mba		< Sango, < Lingala, 20*5, (mya, kúló, kpode, ngündāngū)
Sere		‘kill-persons-five’, < Arabic
Zande	ngbàngbù < Sango	‘ndᵛᵛᵛᵛᵛᵛ

Most of the forms are apparent borrowings which suggests that the term for ‘hundred’ was absent in Proto-Ubangi.

4.7.5.12 ‘Thousand’

The absence of the term for ‘thousand’ in Proto-Ubangi is even more evident than the absence of the term for ‘hundred.’

Table 4.149: Ubangi stems and patterns for ‘1000’

Banda	< French, < Lingala?	
Gbaya-Manza-Ngbaka	< French, < Lingala, tómay	
Ngbandi	< Lingala, < Arabic	
<i>Sere-Ngbaka-Mba</i>		
Ngbaka-Mba	< Lingala, < Arabic, < French, 100*10	gyu
Sere	1000*10	
Zande	< Sango < French	

4.8 Dogon and Bangime

A step-by-step reconstruction of Dogon numerals does not seem reasonable because the family is relatively homogeneous. In addition, the formal differences between the numerical terms do not seem to correlate with the internal genealogical classification of the Dogon languages. The table below offers an overview of the pertinent data (Table 4.150) and is followed by a brief commentary.

Table 4.150: Dogon numerals

1	túru/tumɔ, ti(i)	7	suli/soli/soye
2	lé(y)/ló(y)/né(y)/nó(y)	8	gá(a)rà, sagi, sele (< Mande?)
3	taan	9	túwó
4	nay(n), keeso	10	péru/pélú
5	núnéé(n)/nú:(yn)/nûm	20	10*2
6	kuro/kule	100	80 (sîŋ/súŋ) +20, < Fula
		1000	800 (mújú) +200

‘One’: Najamba-Kindige: *kúndé* ‘1’, Mombo *yè:tá:ngù* ‘1’.

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‘Two’: The forms with the nasal *n*- attested in several dialects are variants of the basic form with **l*-. It should be noted that the final palatal element is systematically attested in other numerical terms, e.g. in Ben Tey (Table 4.151).

Table 4.151: Final palatal in ‘2’

2	yěy	6	kúròy
4	nĩ:y ⁿ	7	súy ⁿ ɔ̃y ⁿ
5	nùmǔy ⁿ	8	gá:rày

Regardless of whether this element is a morpheme or not, we are certainly dealing with a phonetic alignment by the final segment. Thus the final *-y* should not be reconstructed even in those forms that show its presence in the majority of languages.

‘Three’: This is a persistent form with only minor modifications applied to it (e.g. *taandu*, *taali*).

‘Four’: This is the only term for which the final palatal (probably nasalized) is potentially reconstructable. If so, systematic alignments by analogy attested in final segments of other numerals are probably based on the form of ‘four’. The root *kéeso/ ké:jó/ ké:jèy/ cézò/ yè-cézó* is probably an innovation (see, however, Jeff Heath who argues for its archaic nature.²¹) The term may be etymologically connected to the term for ‘eighty’, cf. Najamba-Kindige *sîm*, *kè:sûm*, Tommo So *kèèsûm* and a number of other related forms (Yorno So *dògò-sûm* ‘80’, “Dogon hundred”, Valentin Vydrin, p.c., Perge Tegu *dògò-sûŋ* ‘80’, Yanda Dom *sîŋ* ‘80’ etc.).

‘Five’: The etymological connection of this term with the lexical root meaning ‘hand’ *nùmà/ nùmó/ nùmó/ nõy* is immediately apparent.

‘Six’ and ‘seven’: These are probably primary terms.

‘Eight’: The root *sagi* attested in Najamba and Yanda Dom was probably borrowed from Mande. The forms *sila*, *seele* observable in a number of dialects may

²¹<http://dogonlanguages.org>

be related to it. The root *gá(a)rà* is commonly attested in the majority of languages of this group, sometimes with a partial reduplication (Donno So/Yorno So/Toro So *ga-gara/ga-gira*). Partial reduplication is a popular means of deriving ‘eight’ from ‘four’ commonly attested throughout NC. In view of the fact that the Dogon counting system is based on 8, this root should probably be compared to *gàrá*, meaning ‘big, large, a large quantity, a lot, go beyond (limit), more, to a greater extent’. Tonal differences may be neglected in this case, especially since the derived forms tend to be formally marked, e.g. tonally.

‘Hundred’: The basic ‘large number’ in Dogon is ‘eighty’ rather than ‘hundred’, so this meaning should probably be reconstructed for *siɪŋ/suŋ*. In view of this, the fact that the term for ‘hundred’ was borrowed from Fula in nearly all Dogon languages is not a coincidence.

‘Thousand’: Similarly, the root *muru* (var. *mùsú* / *mùdzú*) ‘800’ incorporated into the pattern ‘1000=800+200’ is reconstructed in Dogon.

The Bangime numeral system should also be considered here, since most of the numerical terms attested in this isolated language are comparable to those found in Dogon (Table 4.152).

Table 4.152: Bangime numerals

1	tòré/tiyé (in counting)	7	kǐjé
2	jíndò	8	sàágín (< Mande?)
3	táárù	9	tégò
4	nǐjé	10	kúré
5	nǔndí	20	tàáwá
6	kěré	100	tèèmèdéré (< Fula)
		1000	mǔzú

As in Dogon, the terms covering the sequence from ‘six’ to ‘nine’ are primary. An isolated root for ‘forty’ (also represented in some of the Dogon languages) is attested in Bangime. Interestingly, the root is the same as the one found in some of the Mande languages, cf. Bangime *dèvé*, Dogulu Dom (Dogon) *dèé*, Mombo (Dogon) *dé:*, Marka Dafing *débe*, Bozo *dèbè/ léwè*, Bamana *dèbè*.

The root for ‘ten’ does not correspond to the one attested in Dogon. The latter finds a direct parallel in Boko (East Mande *kuri* ‘ten’).

4.9 Gur

It should be noted that the Gur languages are extremely divergent in the majority of their numerical terms (including those that prove to be fairly persistent in other families). The approach we took for the evidence studied above (i.e. the establishing of the most common forms and their further comparison to the data from other branches) may not appear fruitful in the case of the Gur languages.

To deal with the problem, we are going to use the classification of the Gur languages found in *Ethnologue*, namely A. Bariba, B. Central, C. Kulango, D. Lobi, E. Senufo, F. Teen, G. Tiefo, H. Tusia, I. Viemo, J. Wara-Natiro.²² The Gur family comprises nearly a hundred languages. In terms of the classification outlined above, their distribution is uneven. Seven groups (Bariba, Kulango, Lobi, Teen, Tiefo, Tusia, Viemo) have an isolated language as their only member. Similarly, Wara-Natiro is represented by only three idioms. This means that the majority of the Gur languages are split between the two remaining groups, i.e. Senufo and Central. The former is comprised of about fifteen languages and is relatively homogenous. Its affiliation to Gur is often considered doubtful. Compared to Central, which embraces the majority of the Gur languages (nearly seventy), this group is relatively small. Two major sub-groups are identifiable within Central, i.e. Northern (38 languages) with Oti-Volta (33 languages) as the dominant branch and Southern (31 languages) with its dominant branch of Grusi (23 languages). In other words, 71 of the Gur languages (out of a total of 91) belong to either Oti-Volta, Grusi or Senufo. In addition to that, there are more than ten branches represented by a single isolated language each. No evidence points to their possible affiliation with the major branches or to their inter-relationship. The same can probably be said about several isolated languages affiliated (often uncritically) with the Central group (the Bwamu, Kurumfe, Dogoso-Khe, Gan-Dogosé, and Kirma-Tyurama branches). This already complex picture gets even more sophisticated in view of the following:

1. Branches represented by one or two languages (e.g. Buli-Konni, Notre, Yom-Nawdm) are distinguishable even within the most reliably established bodies of genetically related languages of this family.
2. According to Ulrich Kleinewillinghöfer (p.c.), who is a renowned expert in both Gur and Adamawa comparative linguistics, a border between these

²²This classification is accepted here with slight modifications based on recent studies. For instance, Dyan and Lobi are treated as members of the same branch.

two families is not clear at all. This means that some of the Gur branches may prove to be more closely related to Adamawa.

Our reconstruction of the Gur numeral system is based on nearly 120 sources that vary in regards to the evidence they offer (cf. our considerations above). By addressing one of the most problematic cases (i.e. the reconstruction of the Gur term for ‘one’) we hope to work out a general approach that will eventually allow further comparison of the Gur evidence to that of other NC families.

4.9.1 ‘One’

The table below lists several forms of the term for ‘one’ in smaller Gur branches (Table 4.153).

Table 4.153: Diversity of stems for ‘1’ in Gur

Gurma	Grusi-Eastern	Grusi-Western
Akaselem: m-bá	Bago-Kusuntu: ɲɔrɔkpákpá	Chakali: dígímáná
Bimoba: yènn	Chala: -re-, -dóndɔlɔɲ	Deg: beɲ-kpaɲ/kpee
Miyobe: n-ni (-se)	Delo: daale	Phuie: déò/dùdúmí
Nateni: -cɔ̃, dèn	Kabiye: kɔ-yóm	Sisaala: kò-bàlá/dián
Ngangam: mi-kpìekm	Lama: kó-dám	Winyé: n-do

A brief study of these examples raises doubts as to whether the Gur numeral system is reconstructable at all (not to mention the Grusi-Northern system or those of the more isolated Gur branches).

Even if we consider one syllable roots of the CV(C)-type only, the impression will remain that every conceivable root for ‘one’ is attested in the Gur languages. However, none of these roots is traceable in at least half of the Gur groups. This situation is reflected in the matrix below (Table 4.154).

The first figure refers to the number of groups where a form is attested (with a maximum of 10 groups), whereas the second one refers to the number of languages. Thus, **B-I** denotes a form comprising a voiced labial consonant (b, w or m) and a front vowel that is attested in five languages within three groups (Central, Lobi-Dyan and Senufo) (Table 4.155).

The remaining forms are quoted below as an illustration of their extreme divergency.

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Table 4.154: Distribution of the CV(C)- forms for ‘1’ in the Gur languages

	I	A	U
P (p/f)	–	–	–
B (b/w/m)	3/5	1/4	1/1?
T (t)	1/1	2/2	–
D (d/l/r/n)	3/16	–	3/13
C (c/s)	–	–	1/1
J (j/y/ny)	1/18	1/1	1/1
K (k/h/x)	2/5	1/2	2/4
G (g/ŋ)	1/5	1/1	1/1

Table 4.155: BI- forms for ‘1’ in Gur (3 groups, 5 languages)

bée	Ditammari	B. Central	1. Northern	C. Oti-Volta	ii. Eastern
biè-	Lobi	D. Lobi-Dyan			
bèg	Dyan	D. Lobi-Dyan			
nì-bín	Cebaara	E. Senufo			
nan-bin	Shempire	E. Senufo			

(1) a. BA (1/4) (Table 4.156).

Table 4.156: BA- forms for ‘1’ in Gur (1 group, 4 languages)

M-bá	Akaselem	B. Central	1. Northern	C. Oti-Volta	Gurma
bàa	Konkomba	B. Central	1. Northern	C. Oti-Volta	Gurma
mi-ba	Ngangam	B. Central	1. Northern	C. Oti-Volta	Gurma
ñ.-bá/-bó	Ntcham	B. Central	1. Northern	C. Oti-Volta	Gurma

b. BU (1/1): only *pú-wò* (possibly *púw-ò*, PU?) in Wara (J.Wara-Natioro)

c. TI (1/1): only *tía* in Baatonum (A.Bariba)

d. TA (2/2) (Table 4.157).

Table 4.157: TA- forms for ‘1’ in Gur

ta, taà, tãà	Kulango (dial.)	C.Kulango
tani	Teen (dial.)	F.Teen

e. DI (3/15) (Table 4.158).

Table 4.158: DI- forms for '1' in Gur

dè	Bwamu (Boore)	B. Central	1. Northern	A. Bwamu	
nmi	Miyobe	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
dèn	Nateni	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
lé	Khe Southern	B. Central	2. Southern	A. Dogoso-Khe	
í-lèŋ	Khisa	B. Central	2. Southern	C. Gan-Dogose	
re-	Chala	B. Central	2. Southern	D. Grusi	i. Eastern
dííŋ	Paasaal	B. Central	2. Southern	D. Grusi	iii. Western
déò	Phuie	B. Central	2. Southern	D. Grusi	iii. Western
díáŋ	Sisaala (dial.)	B. Central	2. Southern	D. Grusi	iii. Western
díén	Sisaala (dial.)	B. Central	2. Southern	D. Grusi	iii. Western
diige	Tampulma	B. Central	2. Southern	D. Grusi	iii. Western
déíŋ	Kirma	B. Central	2. Southern	E. Kirma-Tyurama	
dēén-	Turka	B. Central	2. Southern	E. Kirma-Tyurama	
nò-ni	Karaboro (dial.)	E. Senufo			
dè	Tiefo (dial.)	G. Tiefo			

f. DU (3/13) (Table 4.159)

Table 4.159: DU- forms for '1' in Gur

dòù	Bwamu	B. Central	1. Northern	A. Bwamu	
dòòn	Bwamu	B. Central	1. Northern	A. Bwamu	
dò	Láá Láá	B. Central	1. Northern	A. Bwamu	
rɔ	Chala	B. Central	2. Southern	D. Grusi	i. Eastern
kà-lò	Kasem (dial.) ¹	B. Central	2. Southern	D. Grusi	ii. Northern
kà-lɔ	Kasem (dial.) ²	B. Central	2. Southern	D. Grusi	ii. Northern
è-dù	Lyele	B. Central	2. Southern	D. Grusi	ii. Northern
ù-dù	Northern Nuni	B. Central	2. Southern	D. Grusi	ii. Northern
nè-dò	Southern Nuni	B. Central	2. Southern	D. Grusi	ii. Northern
n-do	Winyé	B. Central	2. Southern	D. Grusi	iii. Western
nú-nu	Nafaanra	E. Senufo			
dūde	Viero	I.Viero			

g. CU (1/2): only *mà-cʰ* in Nateni (Central: 1. Northern: C.Oti-Volta: iii. Gurma

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h. **JI** (1/19) (Table 4.160)

Table 4.160: CI- forms for ‘1’ in Gur

yéŋ/ wà-pī	Buli	B. Central	1. Northern	C. Oti-Volta	i. Buli-Koma
yēn	Mbelime	B. Central	1. Northern	C. Oti-Volta	ii. Eastern
yènn	Bimoba	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
yèn-	Gurma	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
jènn	Moba	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
bō-yén	Birifor (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
bo-yæn	Birifor (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
bō-yen	Dagaara (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén-	Dagaara (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén	Farefare	B. Central	1. Northern	C. Oti-Volta	iv. Western
yé	Moore	B. Central	1. Northern	C. Oti-Volta	iv. Western
bó-ŋjìŋ	Wali	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Dagbani (Dagomba)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yim-	Hanga	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Kamara	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén-	Kantosi	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Mampruli	B. Central	1. Northern	C. Oti-Volta	iv. Western
nyəŋ	Yom (Pila)	B. Central	1. Northern	C. Oti-Volta	v. Yom-Nawdm

i. **JA** (1/1) – only *à-yà?* in Safaliba (B. Central: 1. Northern: C.Oti-Volta: iv. Western)

j. **JU** (1/1) – only *yòn* in Waama (B. Central: 1. Northern: C.Oti-Volta: ii. Eastern)

k. **KI** (2/5) (Table 4.161)

Table 4.161: KI- forms for ‘1’ in Gur

ñ-hén	Nawdm	B. Central	1. Northern	C. Oti-Volta	v. Yom-Nawdm
kpee	Deg	B. Central	2. Southern	D. Grusi	iii. Western
kpéé	Vagla	B. Central	2. Southern	D. Grusi	iii. Western
nì-kĩ	Sicité Senufo	E. Senufo			
nìŋ-kìn	Supyire	E. Senufo			
	Senufo				

l. KA (1/2) (Table 4.162)

Table 4.162: KA- forms for '1' in Gur

beŋ-kpaŋ	Deg	B. Central	2. Southern	D. Grusi	iii. Western
kpáŋ	Vagla	B. Central	2. Southern	D. Grusi	iii. Western

m. KU (2/3) (Table 4.163)

Table 4.163: KU- forms for '1' in Gur

kpò	Khe (dial.)	B. Central	2. Southern	A. Dogoso-Khe
tì-kpóʔ	Dogose	B. Central	2. Southern	C. Gan-Dogose
t^hi-kpo	Kaansá	B. Central	2. Southern	C. Gan-Dogose
nú-kú	Toussian (dial.)	H. Tusia		

n. GI (1/5) (Table 4.164)

Table 4.164: GI- forms for '1' in Gur

niŋ-gbe	Palaka Senufo	E. Senufo
nī-gbe	Nyarafolo Senufo	E. Senufo
ni-gĩ/ni-gĩ	Mamara Senufo (Minyanka)	E. Senufo
nin-gin	Shempire Senufo	E. Senufo
nu-gbe	Tagwana Senufo	E. Senufo

o. GA (1/1) – only *nuŋ-gba* in Djimini Senufo (E. Senufo).

p. GU (1/1) – only *gbú* in Northern Khe (B. Central: 2. Southern: A. Dogoso-Khe).

The only lacuna in this presentation is due to the lack of forms with voiceless labial consonants (this, however, may not prove true in the case of Wara-Natiuro, as we hope to demonstrate below). It should be noted that the general distribution pattern is that a single form is attested in one branch out of ten, three forms are found in both two and three branches, and none of the forms is recorded in four or more branches. This makes an attempt at tracing them down to a source form (with its further comparison to the evidence of the other families) unreasonable.

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

In view of the genetic classification of the Gur languages and the considerations presented above, the optimum solution to the problem probably lies within separate reconstructions of numerals in the following sixteen Gur branches that belong to ten major language groups of this family, assuming that each of them may shed some new light on the reconstruction of the Niger-Congo numeral system:

1. Bariba
2. Central: 1. Northern: A. Bwamu
2. Central: 1. Northern: B. Kurumfe
2. Central: 1. Northern: C. Oti-Volta
2. Central: 2. Southern: A. Dogoso-Khe
2. Central: 2. Southern: C. Gan-Dogose
2. Central: 2. Southern: D. Grusi
2. Central: 2. Southern: E. Kirma-Tyurama
3. Kulango
4. Lobi-Dyan
5. Senufo
6. Teen
7. Tiefo
8. Tusia
9. Viemo
10. Wara-Natioro.

Numerical terms as attested in each of these branches will be examined below.

Table 4.165: Bariba numerals

1	tiā	7	5+2
2	ru	8	5+3
3	i-ta	9	5+4
4	ṅ-nε	10	wɔ-kuru
5	nɔɔbù	20	yendu
6	5+1	100	20*5
		1000	fɛ̀rɔ̀tɔ̀?

4.9.2 Bariba

4.9.3 Central Gur

4.9.3.1 Northern Central Gur

4.9.3.1.1 Bwamu

Table 4.166: Bwamu numerals

1	do	7	5+2
2	ɲū	8	5+3
3	tĩ	9	dĩini/dènú
4	náa	10	pílu/píru/'búruù
5	hò-nú	20	bóni/bénle/kēwēni
6	5+1	100	k ^h iminù (< Mande keme)
		1000	100*10, muaseé

4.9.3.1.2 Kurumfe

4.9.3.1.3 Oti-Volta

i. Buli-Koma (Table 4.168)

ii. Eastern (Table 4.169)

Please note the extreme divergency of languages within this branch: the variety of forms presented in the table above are attested in only four languages, i.e. Biali, Ditammari, Mbelime and Waama.

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Table 4.167: Kurumfe numerals

1	dom	7	pěě
2	hĩ	8	tɔɔ
3	tãã	9	fa
4	nãã	10	fi
5	nɔm	20	sofe (<10?)
6	hɔɔ	100	bɛɔ
		1000	tɛsrɪ < from Moore

Table 4.168: Buli-Koma numerals

1	yéŋ (adj.), ní (count)	7	yòpɔ̄āī, pɔ̄ĩ
2	yè, li	8	nāāniŋ/à-nī (<* 4 redupl., 4PL?)
3	tà	9	nèūk/ŋwé
4	nààsi/nísà	10	pī/bāŋ
5	nù	20	10*2
6	yùèbì/óbìŋ	100	kòòk, kobiga/bórà
		1000	< Engl.

Table 4.169: Eastern Oti-Volta numerals

1	cārā, béé, dènnì (counting), yēnde/yòn, *de	7	pèléi/bérén, yīēkà/nyieke, doodē (6+1)
2	dyā, déé, díání/dæeni, yēdē/yéndí	8	nēi/něi/ni/ninyē
3	tāati/tāadi/tāārī	9	wāi/wei/wē
4	naa(si)	10	pwígō/pííkà/piike/piite, *pi
5	num(mu)/nun	20	10*2
6	kūà/kuɔ, dūo, hǎdwàm, kpàrùn	100	kòyō/kooke/kóúkpà/kòtòtà
		1000	túsirè

iii. Gurma (Table 4.170)

Table 4.170: Gurma numerals

1	bá, yènn(do), den (isol.: ni, c̄5)	7	lòlé/lèlé (isol.: sééi, yehì)
2	le/dé/té	8	ni(n)
3	tà	9	wèʔ/wéé/wòì/wáì
4	nà(hì)	10	píík/p ^w íʔ/fi/pita
5	mù/nùm̄/nu(pū)/ηùn	20	10*2 (isol.: kòó, mùṛkú < mande?)
6	loòb/luu, kòdi/kouulú	100	kúb (isol.: píle, kòta)
		1000	< kùtùkú 'sack', borrowing

iv. Western (Table 4.171)

Table 4.171: Western Oti-Volta numerals

1	yen/yin, dam?, (dàkóʔ)	7	yopoi (< yo-poi?)
2	yi(ʔ)	8	nii(n)
3	ta	9	way/wey
4	naasi/naar/nāan	10	pia/pie
5	nú	20	10*2
6	yobu	100	kob/kɔɔ
		1000	tur/tudi (borrowed?)

v. Yom-Nawdm (Table 4.172)

Table 4.172: Yom-Nawdm numerals

1	hén, nyǎη-/nyǎryǎ-	7	lèbléʔ (<6?), 5+2
2	li/réʔ/*rya?	8	nì:ndí; 10-2
3	ta/tâʔ	9	wéʔ, 10-1
4	naa/nèèsə	10	?ríʔ, feya
5	nu	20	2PL
6	ṁrò:ndí (X+1?), lèèwər	100	lémú, wər-

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

Proto-Oti-Volta The evidence of five Oti-Volta branches (isolated forms excluded) is summarized in Table 4.173.

Table 4.173: Numerals in Proto-Oti-Volta

	i. Buli-Koma	ii. Eastern	iii. Gurma	iv. Western	v. Yom-Nawdm	*Proto-Oti-Volta
1	yéŋ, ní	dènnì, yēnde/yòn, *de	yènn(do), den, ni	yen/yin, dam	hén, nyəŋ	den/yen, ni, de?
2	yè, li	déé(ni), yēdē	le/dé	yi(?)	li/réʔ/ *ɾʔa?	li/yi
3	tà	tāati	tà	ta	ta	ta(t)
4	nāàsì	naa(si)	nà(hì)	naasi	naa/nèèsè	naa(si)
5	nù	nun	nùm/nu/ ŋùn	nú	nu	nu
6	yùèbì/ óbìŋ	dūo	loòb/luu	yobu	lèèw-ər	lob/ yob
7	yòpḡāī, pḡī	doodē (6+1)	lòlé/lèlé	yopoi	lèblé?	*lob-le (6+1)? poi(n)? ni
8	nāāniŋ/ à-nū	nēí/ni/ ninyē	ni(n)	nii(n)	nì:ndí	ni
9	nèük/ŋwé	wái/wei/ wē	wèʔ/wéε/ wái	way/wey	wéʔ	wey/ we?
10	pī	pwígā/ píikà/*pi	píik/p ^w íʔ/ fi	pia/pie	fɛʔa	pi(k)
20	10*2	10*2	10*2	10*2	2PL	10*2
100	kòòk, kobiŋa	kòʔā/ kookε/ kóúkpa	kúb	kob/kɔɔ	lé mú, wɔr-	kob, kook

The reconstruction of the Oti-Volta numeral system is surprisingly unproblematic. In addition to the expectedly persistent reflexes of ‘three’ and ‘four’, homogeneous forms for ‘two’, ‘five’, and ‘ten’ are noteworthy. The term for ‘eight’ seems to be based on ‘four’ (either via the partial reduplication or according to the ‘4PL’ pattern). In addition to that, Oti-Volta is characterized by the presence of the primary (homogeneous) forms of ‘six’, ‘eight’, and ‘nine’. The forms of ‘seven’ are probably derived and follow the pattern ‘6+1’. It appears that the derivative form *lob-le > lole is already reconstructable at the Proto-Oti-Volta level.

4.9.3.2 Southern Central Gur

4.9.3.2.1 Dogoso-Khe

Table 4.174: Dogoso-Khe numerals

1	kpò, lé	7	5+2
2	jɔ(n)	8	5+3
3	thɔ	9	5+4
4	dáa	10	kpélé
5	nɔ(n)	20	cúkúri/gòvsi
6	5+1	100	20*5
		1000	kpé

The forms pertaining to these languages that are not present in the main databases are quoted according to Kerstin Winkellmann in (Winkellmann 2007d: 181–210). Although the numerals attested within the two languages of this group are quite persistent, Kerstin Winkellmann stresses their grammatical difference: “... while Dɔgɔ-sv uses noun suffixes, sv-Khe is a prefixing language” (Winkellmann 2007d: 209).

4.9.3.2.2 Gan-Dogose

Table 4.175: Gan-Dogose numerals

1	kpo/po, (lèn)	7	5+2
2	yɔ́/nɔ́/dʒɔ́ŋ	8	5+3
3	sáa/tʰɔʔ	9	5+4, 10–1
4	nee/i-yìj, (á-dàa)	10	(kpoogo, gbùnè, kpélé, sí-nɔ̃y - 5PL)
5	mwã/wàa, nɔ̃n	20	gbeere, (tfúkúri)
6	5+1	100	20*5
		1000	kpíe ‘a goat’

Three of the languages belonging to this branch show too many forms, suggesting that we are dealing with a heterogeneous branch. In view of its numerical terms, it is not immediately apparent why this branch has been singled out.

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4.9.3.2.3 Grusi

i. *Eastern Grusi (Table 4.176)

Table 4.176: Eastern Grusi numerals (*)

1	dám/lòm/yóm, re/óqɛ	7	lɔbɛ, 6+1, 4+3, 10-3
2	la/lè	8	4 redupl., 4PL, 10-2, toozo, (kɔ̀pèèrè)
3	tòòsò/tooro	9	10-1, isolated forms
4	násá/naara	10	fu, (nóá - 5PL, sàlá)
5	nó/nóŋ, kpási/gbáanzi	20	ko/kuo/koowu, (sao, neélɛ, 10*2)
6	loqò/looro/lèèjò, (3PL)	100	20*5, < Ewe, ('guinea fowl')
		1000	kòtòkó, kpoŋ

ii. *Northern Grusi (Table 4.177)

Table 4.177: Northern Grusi numerals (*)

1	du/lu, (téngí)	7	pè, (4+3, 5+2)
2	le/lè/(ní)	8	nānā (4 redupl.), (lyeɛ, bàndá)
3	tò/twà/cóò	9	nògɔ, nibu, (10-X)
4	na/nīān/nàas	10	fúgá, (fo)
5	nu	20	10*2, (sāpōā, 10+10, swéní)
6	dò, (5+pi)	100	bì, (zóm)
		1000	mòrò

iii. *Western Grusi (Table 4.178)

Table 4.178: Western Grusi numerals (*)

1	kpán/kpee, bala, do/deo/dííŋ/digi	7	lɔp,péé/pie , 5+2
2	le/nɛ/lìɛ	8	córí/kyórí, 5+3, (pɔɔ)
3	toro	9	némé/nibí, 10-1, 5+4
4	naa/naasi/naare	10	fí
5	nue/nwǎ́/nòŋ	20	méré, mɔgɔ (< Mande?), (máágí, toko, ma-cu?)
6	lòrò/*lug/dò, 5+1, (go)	100	kòwá/kóó, zóló, lafa
		1000	gboŋ/bóí

The most probable *Proto-Grusi reconstructions based on the roots attested in at least two Grusi branches are summarized in the table below (Table 4.179).

Table 4.179: Proto-Grusi numeral system (*)

1	do/du/lu, de/re	7	pɛ/lɔ-pɛ/lɔ-bɛ, 5+2
2	lɛ/lɛ/ne/pi	8	4 redupl.
3	toro/toso/tɔ	9	10-1, nibi/nibu (ni-bi/bu?)
4	naare/naasi/na	10	fu/fi
5	nu/nɔ	20	10*2?
6	dɔ/lo-ɔo/lo-ro, 5+1	100	20*5? bi? kɔwa/kɔɔ?
		1000	kpoŋ/gboŋ

4.9.3.2.4 Kirma-Tyurama

Table 4.180: Kirma-Tyurama numerals

1	déiŋ/děěná	7	5+2
2	háĩ/hãl	8	5+3
3	síei/siel	9	5+4, 10-1
4	na(a)	10	núśśǎ/cíŋciélùó
5	di	20	kómòrré/guř
6	5+1	100	gundi, 20*5
		1000	200*5, 800+200

4.9.4 Kulango

The source form of the term for ‘one’ with a nasalized vowel is reconstructed on the basis of the evidence presented by Stefan Elders (2007: 323). As we have seen, the Gur term for ‘five’ is reconstructed as **nu* on the basis of the evidence provided by the groups discussed above. It should be noted that this form goes back to the lexical root meaning ‘hand’ (Kulango *nu-gò*). The term for ‘ten’ in Kulango is a reduplicated **nu*, whereas a different root is attested for ‘five’. It is also noteworthy that the terms for ‘two’, ‘three’, ‘hundred’ and ‘thousand’ are borrowed from Mande.

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Table 4.181: Kulango numeral system

1	ta(a) < *ta̱	7	5+2
2	bila(< Mande), nyʊ̀̀	8	5+3
3	sããbe (< Mande)	9	5+4
4	na	10	nuunu (< *5redupl.), *ji/yi
5	tɔ	20	yipi-/ɖzipi-
6	5+1	100	kɛmɛ̀ (< Mande)
		1000	wulo (< Mande)

4.9.5 Lobi-Dyan

According to Anthony Naden's classification (Naden 1989), these languages belong to different groups of the Gur languages, so their evidence will be presented separately.

"More recent classifications (Labouret and Manessy) regarded Lobi (Lobiri) and Jaane as closely related" (Miehe & Tham 2007: 212) (Table 4.182).

Table 4.182: Lobi-Dyan numerals

	Lobi	Dyan	*Lobi-Dyan
1	bièl, *do	bɛ̃g/bɛ̀̀(ŋ)kù/biɛle, *dù	bièl, *dò
2	nyò/nò	nyò̃	nyò(n)
3	tʰɛ̀r	thɛ̀̀s(i)	thɛ̀̀s(i)/tʰɛ̀r
4	ná	nàà	ná
5	mòl/*mà	dièmà, *mòlò	mòl/*mà/*mòlò, dièmà,
6	5+1	5+1	5+1
7	5+2	5+2	5+2
8	5+3	5+3	5+3
9	10-1	10-1	10-1
10	nyò̀r	ni-kpo	ni-kpo, nyò̀r
20	kpèle	ceeru	kpèle, ceeru
100	tàmâ	tàmúgú	tàmâ
1000	gbòlanɪ	100*10	gbòlanɪ, 100*10

4.9.6 Senufo

Table 4.183: Senufo numerals

1	nòn-, ni-ŋbe/nunɔba, nìkì/ningin	7	5+2, 6+1
2	sin/soin/sun/syen	8	5+3, 6+2
3	tãã/taàr	9	5+4, 10-1, 6+3
4	tésyàr/sìcērē/tityere	10	kε
5	bwa/bwɔ, guru/kuru (<'fist'), guno, (nɔ)	20	gbèŋ/ḡbēy, fulo, toko/togo, nafa, isolated forms
6	kwajì/kwāy, gbaara, ɔɔɔŋ , 5+1, (nōli)	100	20*5, lafa (< Kwa)
		1000	200*5, (gben-, bɔɔɔ, pwoo, sakere)

Many of the forms are quoted in brackets, i.e. they are isolated forms attested within the Senufo group comprising about fifteen idioms. As in a number of other Gur branches, the last syllable/segment of a numerical term often represents a coordinating noun class suffix. Below is an excerpt from the table showing the inflection of numerals by class in Tenyer (Syer variety), as published by Klaudia Dombrowsky-Hahn in Winkelmann 2007a:420, Table 4.184).

Table 4.184: Tenyer numerals (a fragment)

Class SG	u	li	ke	te dim.
'one'	nun	nuni	nunɔ	nunge
Class PL	pi	ki	yi	te dim.
'two'	syob ~ syou	syã	syii	syimbi
'three'	trab	tar	tar	tarbi
'four'	tikyireb	tihyɛr	tihyɛr	tihyerbi

This presentation illustrates how problematic defining the numerical roots can be.

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4.9.7 Teen

Table 4.185: Teen numerals

1	tani	7	5+2
2	nyor	8	5+3
3	sanr	9	10-1
4	nan	10	pərwo
5	tɔ	20	toko
6	5+1	100	20*5
		1000	danye

4.9.8 Tiefó

Table 4.186: Tiefó numerals

1	dě	7	5+2
2	jõ	8	5+3
3	sá	9	5+4
4	ʔuʔɔ́/ɲɔɔ	10	támú, kě
5	kà	20	kpã
6	5+1	100	20*5
		1000	waga (< Mande)

4.9.9 Tusia

Table 4.187: Tusia numerals

1	nónkì, *nǎŋ	7	5+2
2	nínó, *nǎŋ	8	5+3
3	tónó	9	5+4
4	nyáh/jǎ	10	gbām/*gbɔ́/bwò
5	k(w)lɔ́	20	túkúrí, *tiki
6	5+1	100	20*5, kwě
		1000	< páy ‘goat’, náʔ ‘cow’

4.9.10 Viemo

Table 4.188: Viemo numerals

1	dūde, *dun-	7	5+2?
2	niinĩ	8	4*2, 5+3
3	sāsĩ	9	10-1
4	jumĩ	10	kwɔmũ
5	kuεge, *kɔ	20	ferεyɔ
6	5+1	100	tāmõ
		1000	vie-?

4.9.11 Wara-Natioro

It should be noted that the most important evidence pertaining to this group is relatively recent. In his publication of the comparative lexical list Tasséré Sawadogo noted that Faniagara is radically different from both Wara and Natioro (Sawadogo 2002). Its similarity index with the Natioro and Wara dialects is 12 and 30 percent respectively (the SIL list? idem., p. 15). Thus he had every reason to postulate the existence of an isolated language (Palen) in the Wara-Natioro group.

Since the data collected by Tasséré Sawadogo is absent from the major databases that are now incorporated into the RefLex database by Guillaume Segerer, it seems reasonable to present it below for each Wara-Natioro-Paleni idiom in order to suggest the reconstruction of numerical terms within each of the three sub-groups and within the group as a whole (Table 4.189).

According to other sources, the forms *wá/ nwõ, sɔ* are attested in Wara-Natioro for ‘twenty’. The patterns ‘20*5’ and ‘400*2+200’ are attested for ‘hundred’ and ‘thousand’ respectively.

²³Regarding the Natioro forms for ‘one’ André Prost remarks: ‘*puwolo* (après un substantif: *kaaba*)’ (Prost 1968: 78). Thus, the opposition between the Wara and Natioro forms of ‘one’ reflected in the table may be purely functional (for Wara Prost quotes the *puwo* and *kapo* forms).

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

Table 4.189: Wara-Natioro-Paleni numerals

		‘1’	‘2’	‘3’	‘4’	‘5’
Natioro	Dinaoro	ká:bà	ńíndí	táe	ɲnàe	sùsù
Natioro	Timba	ká:bà	ńíndí	tá	ńá	sùsù
Natioro	Kawara	kābà	ńìdí	tá	ńá	sùsù
*Natioro		ká:bà	ńíndí (ka-ba?) ²³	tá(é)	ńá (é)	sùsù
Wara?	Sourani	pó	bǒ	tá	ńásá	sùsù
Wara	Negeni	kàpó	bǒ	tí:	ńá:sú	sùsù
Wara	Niansogoni	pó:wò	bǒ	tí:	ńá:só	sùsù
*Wara		pó	bǒ, *ńíntó	tá(i)	naaso	sùsù,
Palen	Faniagara	káfā	bá	tá:ré	ńá:ré	sùsù
*Palen	Faniagara	ká-fā	bá, *ńínté	tá:ré	ńá:ré	sùsù,
						*si/sɔ
*Wara-		ba/fa,	ńínté, bǒ	ta(r)i	na(r)i	sùsù,
Natioro-		pɔ				sV
Paleni						
		‘6’	‘7’	‘8’	‘9’	‘10’
Natioro	Dinaoro	ɲzàbǒ	té:ndé	ńàngánàngáni	kāwó	pwò:
Natioro	Timba	ɲzà:bó	dé:ndí	ńàngánàngáni	kāwòmú	pwó:
Natioro	Kawara	nsàbǒ	téndí	ńàngánàngádí	kāwūmò	pó
*Natioro		nsàbǒ (sa- 1?)	téndí	4+4	kawo	p(w)ó
Wara?	Sourani	sùrpó	sūrùdó	sìntá	sìn:á	kàn:sú
Wara	Negeni	sírípò	síníntó	síntí	sìn:á:sú	kà:sá
Wara	Niansogoni	sírìpò	sùrùntó	sì:ntí:	sìn:á:sù	kà:sá
*Wara		si-1	si-2	si-3	si-4	kà:sá
Palen	Faniagara	sínífā	sínínté	sǒtá:ré	sǒn:á:ré	fó
*Palen	Faniagara	si-1	si-2	sǒ-3	sǒ-4	fó
*Wara-		5+1	5+2, téndí?	5+3, 4+4	5+4, kawo?	p(w)ɔ/
Natioro-						fɔ,
Paleni						kà:sá?

4.9.12 Proto-Gur

4.9.12.1 ‘One’

The main forms of ‘one’ reconstructable in sixteen branches of Gur are as follows (Table 4.190).

Table 4.190: Stems for ‘1’ in Gur

A. Bariba				tiā
B. Central:	do			
1. Northern				
A. Bwamu				
B. Kurumfe	dom			
C. *Proto-Oti-Volta		den/yen, de?		ni
Southern		le	kpò	
A. Dogoso-Khe				
C. Gan-Dogose		lèŋ	kpo/po	
D. *Proto-Grusi	do/du/lu	de/re		
E. Kirma-Tyurama		déiŋ/děēná		
C. Kulango				ta(a) < *tà̀
D. Lobi-Dyan	*dò			
E. Senufo			ni- ŋgbe/ nu- ŋgba	nikĩ/ ningin
F. Teen			tani	
G. Tiefó		dě		
H. Tusia				nónki
I. Viemo	dūde, *dun-			
J. Wara-Natoro-Paleni			pɔ	

An attempt to reconstruct a Proto-Gur form is probably not reasonable at this point, since all the forms quoted above are important for comparative purposes.

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4.9.12.2 ‘Two’

Table 4.191: Stems for ‘2’ in Gur

	‘2’	‘2’	‘2’	‘2’	‘2’
A. Bariba	ru				
B. Central:					
1. Northern					
A. Bwamu	ɲū				
B. Kurumfe				hĩĩ	
C. *Proto-Oti-Volta		li/yi			
Southern					
A. Dogoso-Khe	jɔ(n)				
C. Gan-Dogose	yɔ̃/ɲɔ̃/dʒɔ̃ŋ				
D. *Proto-Grusi		le/le	ne/pi		
E. Kirma-Tyurama				hãĩ/hãl	
C. Kulango	nyʊò				bila (< Mande)
D. Lobi-Dyan	nyò(n)				
E. Senufo					sin/soin/ sun/syen
F. Teen	nyor				
G. Tiefó	jõ				
H. Tusia			nínó, *nĩŋ		
I. Viemo			niinĩ		
J. Wara-Natioro-Paleni			nínté		bõ

Apparent isolates and obvious borrowings are presented in the rightmost column.

4.9.12.3 ‘Three’ and ‘Four’

Table 4.192: Stems for ‘3’ and ‘4’ in Gur

	3	3	4	4
A. Bariba	i-ta		ñ-ne	
B. Central:				
1. Northern				
A. Bwamu	tī		náa	
B. Kurumfe	tãã		nãã	
C. *Proto-Oti-Volta	ta(t)		naa(si)	
Southern				
A. Dogoso-Khe	tho		dáa	
C. Gan-Dogose	sáa/t ^h ɔʔ		nee/i-yi̯i, (á-dàa)	
D. *Proto-Grusi	toro/toso/tɔ		naare/naasi/na	
E. Kirma-Tyurama	síei/siɛl		na(a)	
C. Kulango		sããbe (< Mande)	na	
D. Lobi-Dyan	thês(i)/t ^h ěr		ná	
E. Senufo	tãã/taàr			tésyàr/ sícērĒ/ tityere
F. Teen	sanr		nan	
G. Tiefo	sá			ʔuʔʔ/ηɔɔ
H. Tusia	tónó		nyáh/jã	
I. Viemo	sãsi			jumĩ
J. Wara-Natorio-Paleni	ta(r)i		na(r)i	

The reflexes of the most persistent NC roots are observable in the majority of the branches.

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4.9.12.4 ‘Five’

Table 4.193: Stems for ‘5’ in Gur

	‘5’	‘5’	‘5’	‘5’	‘5’
A. Bariba	nòòbù				
B. Central:					
1. Northern					
A. Bwamu	hò-nú				
B. Kurumfe	nɔm				
C. *Proto-Oti-Volta	nu				
Southern					
A. Dogoso-Khe	nɔ(n)				
C. Gan-Dogose	nɔ̃n	mwã/ wàa			
D. *Proto-Grusi	nu/nɔ				
E. Kirma-Tyurama				di	
C. Kulango			tɔ		
D. Lobi-Dyan		mòì/ *mà/ *mɔ̀lò		dièmà	
E. Senufo	guno, (nɔ)	bwa/ bwɔ			
F. Teen			tɔ		
G. Tiefo					kà
H. Tusia					k(w)lɔ
I. Viemo					kuege, *kɔ
J. Wara-Natioro-Paleni			sùsú, sV		

The etymological relationship of **nu* ‘5’ and ‘hand’, is attested in Central Gur and possibly in Bariba and Senufo. Isolated bases may go back to this meaning as well. At the same time, the base preserved in Kulango, Teen and possibly Wara-Natioro-Paleni is comparable to **tan* found in BC and some other families.

4.9.12.5 ‘Six’ and ‘Seven’

Table 4.194: Stems and patterns for ‘6’ and ‘7’ in Gur

	‘6’	‘6’	‘7’	‘7’	‘7’
A. Bariba	5+1		5+2		
B. Central:					
1. Northern					
A. Bwamu	5+1		5+2		
B. Kurumfe		hɔrɔ		pěě	
C. *Proto-Oti-Volta		lob/yob		poi(n)?	*lob-le (6+1)?
Southern					
A. Dogoso-Khe	5+1		5+2		
C. Gan-Dogose	5+1		5+2		
D. *Proto-Grusi	5+1	dɔ/lo- ɖo/lo-ro	5+2	pɛ/lɔ- pɛ/lɔ-bɛ	
E. Kirma-Tyurama	5+1		5+2		
C. Kulango	5+1		5+2		
D. Lobi-Dyan	5+1		5+2		
E. Senufo	5+1,	kwaj̃/ kwāy, gbaara, nōli	5+2		6+1
F. Teen	5+1		5+2		
G. Tiefo	5+1		5+2		
H. Tusia	5+1		5+2		
I. Viemo	5+1		5+2?		
J. Wara-Natioro-Paleni	5+1		5+2		téndí?

The patterns *‘6=5+1’ and *‘7=5+2’ can be safely reconstructed at the Proto-Gur level. The exceptionally wide range of forms for ‘six’ attested in Senufo is noteworthy.

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4.9.12.6 'Eight' and 'Nine'

Table 4.195: Stems and patterns for '8' and '9' in Gur

	'8'	'8'	'8'	'9'	'9'	'9'
A. Bariba	5+3			5+4		
B. Central:						
1. Northern						
A. Bwamu	5+3					d̩iini/d̩enu
B. Kurumfe			tɔɔ			fa
C. *Proto-Oti-Volta			ni			wey/we?
Southern						
A. Dogoso-Khe	5+3			5+4		
C. Gan-Dogose	5+3			5+4	10-1	
D. *Proto-Grusi		4 redupl.			10-1	nibi/nibu (ni-bi/bu?)
E. Kirma-Tyurama	5+3			5+4	10-1	
C. Kulango	5+3			5+4		
D. Lobi-Dyan	5+3				10-1	
E. Senufo	5+3		6+2	5+4	10-1	6+3
F. Teen	5+3				10-1	
G. Tiefo	5+3			5+4		
H. Tusia	5+3			5+4		
I. Viemo	5+3	4*2			10-1	
J. Wara-Natioro-Paleni	5+3	4+4		5+4		kawo?

In addition to the common patterns '8=5+3' and '9=5+4', alternative ones are attested for 'eight' and 'nine' ('8=4 redupl.' and '9=10-1' respectively).

4.9.12.7 ‘Ten’

Table 4.196: Stems for ‘10’ in Gur

A. Bariba		wɔ-kuru		
B. Central:				
1. Northern				
A. Bwamu	pílú/píru/ ʔbúrúù			
B. Kurumfe	fɪ			
C. *Proto-Oti-Volta	pi(k)			
Southern				
A. Dogoso-Khe	kpélé			
C. Gan-Dogose		kpoogo	nõy - 5PL	gbùnè, kpélé, sí-
D. *Proto-Grusi	fu/fi			
E. Kirma-Tyurama			núʃsɔ̀	cíŋciélùó
C. Kulango				nuunu (< *5 redupl.), *ji/yi
D. Lobi-Dyan		ni-kpo	nyòór	
E. Senufo				kɛ
F. Teen	pɔrwɔ			
G. Tiefó				kɛ́
H. Tusia				támú gbām/ *gbɔ́/ bwò
I. Viemo		kwɔmũ		
J. Wara-Natorio-Paleni	p(w)ɔ/fɔ			kâ:sá?

This term exhibits a variety of isolated (and possibly non-primary) forms. The main form has a voiceless labial as its initial consonant.

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4.9.12.8 ‘Twenty’

Table 4.197: Stems and patterns for ‘20’ in Gur

	‘20’	‘20’	‘20’	‘20’	‘20’
A. Bariba					yendu
B. Central:					
1. Northern					
A. Bwamu		bóní/ bénle/ kēwēnî			
B. Kurumfe	sofe (<10?)				
C. *Proto-Oti-Volta	10*2				
Southern					
A. Dogoso-Khe		gòʊsi	cúkúrí		
C. Gan-Dogose		gbeere	tʃúkúrí		
D. *Proto-Grusi	10*2?				
E. Kirma-Tyurama		guĩ			kómòrré
C. Kulango					yipì-/ dzipi-
D. Lobi-Dyan		kpèle	ceeru		
E. Senufo		gbèj/ gbēy,		toko/ togo toko	fulo, nafa
F. Teen					kpā
G. Tiefó					*tiki
H. Tusia			túkúrí		fereyɔ
I. Viemo					wá/nwõ, sɔ
J. Wara-Natioro-Paleni					

In view of the great variety of forms and patterns attested for this term, the existence of the term for ‘twenty’ in Proto-Gur is uncertain.

4.9.12.9 ‘Hundred’

Table 4.198: Stems and patterns for ‘100’ in Gur

A. Bariba	20*5		
B. Central:			
1. Northern			
A. Bwamu			k ^h iminù (< Mande keme)
B. Kurumfe			berɔ
C. *Proto-Oti-Volta		kob, kook	
Southern			
A. Dogoso-Khe	20*5		
C. Gan-Dogose	20*5		
D. *Proto-Grusi	20*5?	kɔwa/kɔɔ?	bi?
E. Kirma-Tyurama	20*5		gundi
C. Kulango			kemè (< Mande)
D. Lobi-Dyan		tâmâ	
E. Senufo	20*5		lafa (< Kwa)
F. Teen	20*5		
G. Tiefo	20*5		
H. Tusia	20*5	kwě	
I. Viemo		tãmõ	
J. Wara-Natiuro-Paleni	20*5		

4.9.12.10 ‘Thousand’

No evidence supports the reconstruction of the term for ‘thousand’ in this family.

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Table 4.199: Stems and patterns for '1000' in Gur

A. Bariba			fɪ̀r̀ɔ̀tɔ̀?	
B. Central:				
1. Northern				
A. Bwamu		100*10	muaseé	
B. Kurumfe				tɔ̀srɪ̀
				(< Moore)
C. *Proto-Oti-Volta				
Southern				
A. Dogoso-Khe	kpé			
C. Gan-Dogose	kpíɛ			
	'a goat'			
D. *Proto-Grusi			kpoŋ/ gboŋ	
E. Kirma-Tyurama		200*5, 800+200		
C. Kulango				wulo
				(< Mande)
D. Lobi-Dyan		100*10	gbòlanɪ̀	
E. Senufo		200*5	gben-, bɔ̀b, pwoo, sakere danye	
F. Teen				
G. Tiefɔ̀				waga
				(< Mande)
H. Tusia	< píy 'goat', náʼ 'cow'			
I. Viemo	vie-?			
J. Wara-Natioro-Paleni		400*2+20		

4.10 Mande

The intermediate step-by-step reconstructions available for the Mande languages in Vydrin’s Mande Etymological Dictionary and in Vydrin 2007²⁴ has made treatment of the data easier.

The genetic classification of Mande, outlined in the latter work, will serve as the basis for our analysis. This classification differs from the one suggested by Kastenholz and is accessible via *Ethnologue* (Simons & Fenning 2018). According to V. Vydrin,

Its major innovations, in comparison with that of Kastenholz, are the following:

- the Susu–Jalonke group is put together with the Southwestern group, rather than with Kastenholz’s “Central Mande” (in fact, it is a return to the proposal of André Prost 1958);
- Soninke–Bozo, Samogho and Bobo are no longer considered as branches of the same genetic unit (Kastenholz’s “Northwestern Mande”), but rather as independent groups inside Western Mande;
- the Mokole group is put together with Vai–Kono, rather than with Manding;
- in the Southern Mande group, Mwan is separated from Wan and put together with the Guro–Yaure subgroup;
- San (Samo) is put together with Bisa, rather than with Busa-Boko.’ (Vydrin 2016: 110).

Let us note an important fact: the numeral system of Jowulu differs considerably in certain points both from other Samogho languages and from Mande languages in general. It is interesting to outline that in R. Kastenholz’s classification (based on the method of shared innovations, rather than on lexicostatistics) Jowulu is given a special status, more precisely, the first split in his Northwestern Mande branch (Bozo-Soninke + Bobo + Samogo + Jowulu).

Our further analysis will be based on the evidence from twelve branches of Mande represented in Figure 4.1.

²⁴I would like to thank V. Vydrin for his suggestions and comments on the preliminary draft of this chapter.

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1. Manding		7. Bozo-Soninke	
2. Jogo-Jeri		8. Bobo	
3. Mokole	5. Susu	9. Samogo	11. Eastern
4. Vai-Kono	6. SWM	10. Jowulu	12. Southern

Figure 4.1: Mande languages

4.10.1 ‘One’

Table 4.200: Mande stems for ‘1’

Manding	*dó	*kélen			
Jogo-Jeri	*do	*kéle (?)			díé(n)/dúli
Mokole	*dóndò	*kéle			
Vai-Kono	*dóndò	*N-kélen			
Susu		*kédén	nde/ndá		
SWM		*gíláaŋ	*tà		
Bozo-Soninke		kuɔn/ kɛɛ/ ke/ko		sana	bane, fie
Bobo			tàlá/télé		
Dzuun (Samogo)		*ké		*so/sɔʔi/ swě	
Jowulu			těěna/ tenŋ		
SE-Eastern	*do	gòrɔ́/ gôon?			
SE-Southern	*dó				

Vydrin’s preliminary reconstructions, as well as isolated forms resulting from the analysis of the numerical terms, are marked with an asterisk [*].

The isoglosses for ‘one’ suggest the existence of two alternative roots (*dó and *kelen) attested in both major Mande groups. The latter root is distinguishable under the assumption that the forms with a voiced velar attested in the Eastern branch of the South-Eastern group (Matya Samo gòrɔ́, Southern Samo (Maka) gôon) are related to the k-forms found in Western Mande.

The next two roots, if related, may be suggestive with regard to the classification of Western Mande (otherwise, they probably represent similar unrelated forms). It should be noted that the root *ndá* (Susu *nde* ‘one, certain’, *ndende* ‘anybody, whoever; nobody’, Jalonke *ndá* ‘certain’) attested, according to Vydrin, in Susu-Jalonke may be related to **dɔ*. The determiner **dɔ*, which can be reconstructed at the Proto-Mande level, goes back to the root **do*.

The rightmost column of the table embraces the isolated forms.

4.10.2 ‘Two’

Table 4.201: Mande stems for ‘2’

Manding	*filá
Jogo-Jeri	*fálá
Mokole	*fila
Vai-Kono	*fèLá
Susu	*fidín
SWM	*fèelé
Bozo-Soninke	pè:ndé, fillò
Bobo	pálà
Dzuun (Samogo)	fi:(kí)
Jowulu	fúúli
SE-Eastern	*pela
SE-Southern	*pù-lāŋ

A common root for ‘two’ that may be tentatively recorded as **pila / fila* is attested in all Mande branches. Its precise phonetic reconstruction is beyond the scope of our investigation. The reader can refer to the works of specialists in the historical phonetics of Mande. A reference designation that will enable us to compare this root to the evidence of the other NC families is sufficient for our reconstruction purposes.

4.10.3 ‘Three’

The common root **sakpa/ sagba/ sawa* is represented in all Western branches. The relationship between some of the forms attested in the Eastern group (Southern Samo (Maka) *sɔ̄̄*, Matya Samo *tjɔwɔ*) remains uncertain. The Jowulu form is especially peculiar. It should be noted that the forms of some numerical terms

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Table 4.202: Mande stems for ‘3’

Manding	sàbá	
Jogo-Jeri	sègbá/sigbù	
Mokole	sàwa/saba	
Vai-Kono	sàkpá/sagba/sáwa	
Susu	sàxán/sàqáŋ/sawa	
SWM	sàwá/sāabā	
Bozo-Soninke	sikkò, sike	
Bobo	sàà (?)	
Dzuun (Samogo)	ʒiʔi/ʒi:gī /fʷè/yei	
Jowulu	bʒei < *jɔŋŋ/i?	
SE-Eastern	sɔɔ/ców?	ʔààkō
SE-Southern		*yààká

Table 4.203: Jowulu numerals

Source	‘1’	‘2’	‘3’	‘4’	‘5’
Hochstetler (1996)	těēna	fuuli	bʒei, *dʒō	pʃireʹ	tāā
Djilla et al. (2004)	tenŋ	fúúli	byàŋ, *jòn	pyiiranŋ	táánŋ
Carlson (1993)	tě̀èni	fuʹuʹli	byāī, *jōō	piʹiʹrēi	taʹaʹ
Prost (1958)	tēna	fole	dyue, *dyô	piee	tâ
Source	‘6’	‘7’	‘8’	‘9’	‘10’
Hochstetler (1996)	tāmāni	dʒōm-pɔn	ful-pɔn	tēm-pɔn	bʒīi
Djilla et al. (2004)	táán-mání	jòn-pɔnni	fuuli-pɔnni	ten-pɔnni	byinŋ
Carlson (1993)	taʹaʹ-māni	jōō-poʹni	fuʹl-poʹni	tēē-poʹni	byi
Prost (1958)	ton-te	dyômpônô	filepônô	têpônô	bî

differ significantly depending on the source. Our study is based on four Jowulu sources that provide the following evidence²⁵ (Table 4.203).

The terms for ‘seven’, ‘eight’ and ‘nine’ follow the pattern ‘3,2,1+‘to lose’’ respectively (cf. their inaccurate interpretation in Hochstetler, see §4.10.9), hence the reconstruction of the term for ‘three’ with the initial palatal (*jòn). The forms quoted in Jowulu for ‘three’, ‘four’, and ‘ten’ are uncommon. If we were dealing

²⁵Hochstetler (1996); Djilla et al. (2004); Carlson (1993); Prost (1958).

with a language with a noun class system, we would have to conclude that a noun class marker (CL19?) with two allomorphs (**p**- and **b**- before voiced and voiceless respectively) is traceable in the pertinent forms. However, we are dealing with a language that undoubtedly belongs to Mande, so no class-related morphemes can be involved. This leaves the presence of the initial labial in the term for ‘three’ unexplained. A borrowing from Gur or Kru cannot be assumed since these languages lack the comparable forms. The only plausible solution is the alignment of ‘three’ and ‘four’ by analogy with ‘ten’ where it must have been originally present.

A special term for ‘three’ appears in South-Eastern. In Eastern it can be reconstructed as **ʔààkɔ̃* or possibly ***ʔàà-(kɔ̃)*, cf. Bisa *kakɔ̃*, Boko *ʔààɔ̃* (in Koelle 1963[1854] *ááyɔ̃*), Bokobaru (Zogbɛ̃) *ʔààgɔ̃*, Busa *ʔààkɔ̃*, Maya Samo *kàakú*, Kyanga *ʔàà*, and Shanga *ʔà*. The latter reconstruction is supported by the fact that the terms for ‘three’ and ‘four’ share the ultima, cf. the data are presented in Table 4.204.

Table 4.204: Final morphemes in the Boko-Busa numerals

	Boko	Boko (Koelle 1963[1854])	Bokobaru	Busa
‘3’	ʔàà-ɔ̃	áá-ɣɔ̃	ʔàà-gɔ̃	ʔàà-kɔ̃
‘4’	síí-ɔ̃	síí-ɣɔ̃	síí-gɔ̃	ʃíí-kɔ̃

It should be noted that in these languages, the syllable in question is also present in the terms for ‘eight’ that are built according to the pattern ‘5+3’ (cf. e.g. Bobo Karu *sír-ààgɔ̃*). Here we may be dealing with alignment by analogy, possibly with an additional final morpheme of uncertain meaning. It should be stressed that the ultima in ‘three’ and ‘four’ is never the same in the Eastern subgroup of the South-Eastern languages, whereas the medial velar is only attested in ‘three’ but not in ‘four’. Assuming that the forms of the two Eastern branches are related, the term for ‘three’ can be reconstructed as **ʔààkɔ̃/yààká*, whereas the term for ‘four’ may be interpreted as resulting from the alignment by analogy with the forms of ‘three’ attested in the Eastern branch of South-Eastern Mande. The evidence in favor of its etymological connection with **sákpa* is inconclusive.

4.10.4 ‘Four’

An easily recognizable NC form (**náání/ nããi*) can be reconstructed in Western Mande, whereas in South-Eastern Mande it is replaced with an innovation

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Table 4.205: Mande stems for ‘4’

Manding	*náani	
Jogo-Jeri	náani	
Mokole	náani	
Vai-Kono	nááni	
Susu	náání	
SWM	*nááni	
Bozo-Soninke	na:na/nàtá/nà:rà/naxat-	
Bobo	náà/nĩã	
Dzuun (Samogo)	nã̃i/naai/nà:lé	
Jowulu		pʃɪrɛ! <ʃɪrɛ!?
SE-Eastern		sì/sííkɔ̃
SE-Southern		*ỹi-s̃ĩỹá: z̃ĩé/ỹĩ-s̃ĩé

(*s̃ĩỹá). This innovation may also be attested in Jowulu.

4.10.5 ‘Five’

Table 4.206: Mande stems for ‘5’

Manding	dúuru/loolu	*wo (cf. ‘7’)	
Jogo-Jeri	sóólò/sóolo		
Mokole	lólólu	*wo (cf. ‘7’)	
Vai-Kono	dúʔu/sóó(?)ú		
Susu	suuli/sùlù	*fò (cf. ‘7’)	
SWM	dóólú/lóólú	*wɔ/ngò	
Bozo-Soninke		kólóhò/kárágò	
Bobo		kō̄/kóò	
Dzuun (Samogo)			nũ
Jowulu			tãã
SE-Eastern	*sodu: sósóro/sóò		
SE-Southern	sósódú/sólú		

There is a correspondence between d-/l-/s- within Western Mande, hence the Eastern forms with the initial s- should not necessarily be treated separately. A discussion of the exact phonetic reconstruction is better left to specialists in the

field. For our purposes, it is sufficient to record that the Proto-Mande root for ‘five’ is reconstructed as *dúuru/ sóru*.

However, the root(s) **wo, *ko* are traceable in the compound numerical terms attested in Western Mande. They may be etymologically related to the lexical root meaning ‘hand’ (Vydrin, p.c.; cf. Proto-South-Mande **kɔ* ‘hand’). The latter may be a NC root, cf. e.g. the term for ‘hand’ in Proto-Gbaya (*kɔ*), Dida (Kru) (*kɔ*) and in other languages.

The Jowulu and Samogo forms are peculiar. As we hope to demonstrate in the next chapter, two alternative roots for ‘five’ can be reconstructed for NC, namely **tan/ ton* and **nu(n)*. Both roots are directly attested in these marginal groups. Is this enough to reconstruct the terms for ‘five’ traceable in NC for the Mande languages? We will return to this question in the last chapter of the book.

4.10.6 ‘Six’

Table 4.207: Mande stems and patterns for ‘6’

Manding	wórwɔ (5+1)	
Jogo-Jeri	mòdòdó (5+1?)/mì:lù	
Mokole	wórwɛ/wɔrwɔ (5+1)	
Vai-Kono	wórwɔ/wɔrwɔ (5+1)	
Susu	sénní (5+1?)	
SWM	*5+1	
Bozo-Soninke	goro? (5+1?)	túmù/tūmi
Bobo	5+1	
Dzuun (Samogo)		t(s)ùmě́ /tsù
Jowulu	5+1	
SE-Eastern	5+1	
SE-Southern	5+1, wáǎ?	

The reconstruction of the Mande term for ‘six’ is problematic. The root *t(s)um* is worth considering, since it is attested in both Bozo-Soninke and Samogo (the root found in Susu is probably isolated). Its reconstruction at the Proto-Mande level is, however, unlikely. The common pattern ‘6=5+1’ is attested in both major branches. The root *wɔrwɔ* is non-primary and eventually goes back to the aforementioned pattern (or to the pattern ‘6’=‘hand’+1’ to be precise). This hypothesis is supported by the forms of ‘seven’ as well.

4.10.7 ‘Seven’

Table 4.208: Mande stems and patterns for ‘7’

Manding	x+2	
Jogo-Jeri	ma+2	
Mokole	x+2	
Vai-Kono	5+2	
Susu	5+2	
SWM	5+2	
Bozo-Soninke	ɲérù/jeeni	
Bobo	5+2	
Dzuun (Samogo)	ɲè:nú (<5?)/ɲèè	
Jowulu		3+ ‘to lose’
SE-Eastern	5+2	
SE-Southern	5+2	

A few remarks are in order before we turn to the discussion of the term for ‘seven’. In the majority of the Mande branches, the term represents a compound. Its second element goes back to the term for ‘two’, cf. e.g. Jula *wólonfilà* ‘7’, *filà* ‘2’.

The relationship between the terms for ‘six’ and ‘seven’ is based on alignment by analogy. This bond sometimes results in unification of the terms, so that sources may explain ‘seven’ as ‘6+1’ (despite the fact that ‘two’, not ‘one’, is manifestly present in ‘seven’). This interpretation has become recurrent for the Mokole languages. According to Phillip Logan,²⁶ the Kuranko evidence is as follows: *wɔɔɲfila* (‘6+1’) (?! –K.P.), *wɔɔ* ‘6’, *fila* ‘2’, *kelen* ‘1’. The same idea is applied to Lele (cf. Marc Gebhard:²⁷ *wɔɔɲ kela* (‘6+1’),²⁸ *wɔɔ* ‘6’, *fela* ‘2’, *keleɲ* ‘1’) and Kakabe (cf. Daria Mishchenko:²⁹ *wɔɔwila* (‘6+1’), *wɔɔ* ‘6’, *fila* ‘2’, *kélen* ‘1’). Other scholars are more reserved, stating that ‘Kono has a decimal system with special construction for 7’.³⁰ It is, however, quite evident that the forms in

²⁶<https://mpi-lingweb.shh.mpg.de/numeral/Kuranko.htm>

²⁷<https://mpi-lingweb.shh.mpg.de/numeral/Lele-Mande.htm>

²⁸According to Vydrine (2009), the Lele term for ‘seven’ is *wɔɔɲcela* (or *wɔɔɲkela* in the Southern dialect, <https://mpi-lingweb.shh.mpg.de/numeral/Jowulu.htm>) *núú gbɔyɔngo* ‘20’ (‘person finished’, <https://mpi-lingweb.shh.mpg.de/numeral/Mende.htm>)

²⁹<https://mpi-lingweb.shh.mpg.de/numeral/Kakabe.htm>

³⁰Raimund Kastenholz, <https://mpi-lingweb.shh.mpg.de/numeral/Kono.htm>

question follow the pattern ‘5+2’ (or at least ‘X+2’ with X being an unidentified component).

It is not a mere coincidence that the interpretation outlined above is recurrent in the Mokole languages, where the forms of ‘six’ and ‘seven’ have become partially unified. In a number of languages from other groups that have etymologically related terms for ‘six’ and ‘seven’, these terms differ in their second consonant, cf. Bamana (Manding): *wólonwula* ‘7’, *wóɔɔ* ‘6’.

In both groups of South-Eastern Mande the patterns ‘5+1’ and ‘5+2’ for ‘six’ and ‘seven’ respectively are still clearly recognizable (Table 4.209).

Table 4.209: Stems for ‘6’ and ‘7’ in South-Eastern Mande

	‘5’	‘1’	‘6’	‘2’	‘7’
SE: Eastern: Busa	sóo	do	sóo-do	pia	soo-pia
SE: Southern: Beng	só-ŋ	do	só-do	pla-ŋ	só-pla

Taking all of this into consideration, the most likely evolution scenario for ‘six’ and ‘seven’ is as follows:

- At the most archaic Proto-Mande level the terms for ‘six’, ‘seven’ (and also ‘eight’ as we hope to demonstrate below) followed the pattern ‘X+1,2,3’ respectively. The X-element in this pattern possibly represented an archaic root with the meaning ‘hand’ (?) **ko* (**N-ko* > **go/wo?*).
- Proto-Mande developed the root **dúuru/ sóru* ‘5’.
- This new root served as the basis for the South-Eastern Mande terms for ‘six’, ‘seven’ and ‘eight’.
- In Western Mande this process is only attested in single languages, e.g. in Vai (*sóóúú* ‘5’, *sôŋ lëndó* ‘6’ (*lëndó* ‘1’), *sôŋ fê?á* ‘7’ (*fê?á* ‘2’)) and Looma (*dooluo* ‘5’, *dɔzita* ‘6’, *dɔfela* ‘7’, *dósáwà* ‘8’).
- The majority of the Western Mande languages retained the inherent forms for ‘six’ and ‘seven’, but their derivational motivation became unapparent (at least in the case of the first component, cf. Bandi *ndóólú(ŋ)* ‘5’, but *ngòhítán* ‘6’ (*hítán* ‘1’) and *ngòfèlàn* ‘7’ (*feelé* ‘2’) in contrast to Looma).
- This factor conditioned the partial unification of the terms for ‘six’ and ‘seven’ (by analogy) in some of the Western Mande languages (Mokole in particular).

4.10.8 ‘Eight’

Table 4.210: Mande stems and patterns for ‘8’

Manding	séegi/séki/séyi		
Jogo-Jeri		ma+3	
Mokole	séen/saen/seyi		
Vai-Kono	séi/séin	5+3	
Susu		5+3	
SWM		wá-yákpá/ wɔ-yaagba/ ngòsákbá(n) (5+3)	
Bozo-Soninke	segi-/seegu		
Bobo	séki/tfèkí		
Dzuun (Samogo)			kàà, 4pl
Jowulu			2+ ‘to lose’
SE-Eastern		*5+3	síjɛ, kíwísí (<4)
SE-Southern		sǎǎ-gǎ/sálààkǎ/ sòlǎá/sé-yǎ (5+3?)	

The pattern ‘8=4*2’/‘4PL’ commonly found in the majority of the families discussed above is barely attested in Mande. Meanwhile, the phonetic similarity between *naai* ‘4’ ~ *ɲaai(n)* ‘8’ (attested in the majority of the Samogo dialects) is hardly an accident.

The etymology of *kàà* (not found outside Seenku) is unknown.

The pattern ‘5+3’ is inconclusive, because it often develops independently in various languages. The interpretation of the main Mande root (tentatively described as *seki/ segi*) is uncertain. On the one hand, its current forms suggest that this root can be reconstructed not only for Proto-Western Mande, but for Proto-Mande as well (cf. South-Eastern forms, in particular *sǎǎgǎ* ‘8’). On the other hand, such reconstruction is hindered by at least two issues.

Firstly, the second velar in the South-Eastern Mande forms does not belong to the root. It is part of a reduced segment that goes back to the term for ‘three’ (cf. Tura *yǎká* ‘3’), whereas the first segment goes back to the term for ‘five’ (cf. Tura *sòlú, sǒlú, sǔlú*). The comparative analysis of the forms of ‘eight’ attested in

the South-Eastern Mande languages (not quoted here in detail) strongly suggests that the South-Eastern Mande pattern for ‘eight’ is ‘5+3’.

Secondly, this reconstruction is problematic from a typological point of view. As has been demonstrated above, our evidence prevents us from reconstructing primary roots for ‘six’ and ‘seven’. In terms of typology, a primary root for ‘eight’ would look highly unusual in this context. Such a root could be expected in those few numeral systems where ‘eight’ is a basic numeral (just like ‘twelve’ is a basic numeral in some of the Benue-Congo numeral systems described above, hence ‘100=12*8+4’). However, ‘eight’ has never been a basic unit of counting in Mande systems. The existence of a primary term for ‘forty’ (assuming that ‘forty’ is ‘8*5’) in some of the Mande languages could be interpreted as a hint at a special status of ‘eight’. However, this is not supported by any real evidence.

This raises a question about the etymology of the Western Mande term for ‘eight’ (*seki/ segi*). Its resemblance to the term for ‘three’ (especially in Bozo and Soninke, cf. Jenaama Bozo *sikêũ* ‘3’ ~ *sèk:i* ‘8’) may be suggestive here. Is there enough evidence to reject the hypothesis that ‘eight’ in the Proto-Western Mande was built according to the pattern ‘8=plus 3’ (this would assume a counting reference to ‘five’)?

Despite the doubts expressed above, these forms are worth comparing to other forms of ‘eight’ attested in other NC families.

4.10.9 ‘Nine’

Table 4.211: Mande stems and patterns for ‘9’

Manding		kòṅòntò (10-1?)	
Jogo-Jeri	ma+4		
Mokole		kòṅòndòṅ (10-1?)	
Vai-Kono	5+4	kòṅóntòṅ	
Susu	5+4		
SWM	5+4	10-1	
Bozo-Soninke			kàp:i/káfi/kabi
Bobo		kòròṅòṅ	
Dzuun (Samogo)			kjè:rǒ/kle:lo/kùòmè
Jowulu		1+‘lose’	
SE-Eastern	5+4	10-1	
SE-Southern	5+4		

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Two competitive patterns are distinguishable here ('9=5+4' and '9=10-1'). In some of the branches (e.g. SWM, Vai-Kono) they are attested side-by-side.

At the same time, these patterns cannot be postulated for some of the languages without additional support. The pattern '9=10-1' seems to be apparent in South-Eastern Mande and some of the SWM languages only, cf. Boko '9': *kě̀okwi* (lit: 'tear away 1 (from) 10'), *kwi* '10'; in Busa '9': *kě̀ndo/kí̀ndokwi* (lit: 'tear away 1 (from) 10'), *kwi* '10', *do* '1'; in Bandi (SWM) *taá-vu* '9', *ità(η)* '1', *púu* '10'. According to Robert Carlson (Carlson 1993: 30), the terms from 'seven' to 'nine' in Jowulu follow the pattern '1-3' + 'lose' (*fóni*), i.e. *jǎǎ-póni* '7', *fúl-póni* '8', and *tě̀ě-póni* '9' (note that these terms are misinterpreted as 3+4, 2*4, 5+4³¹ by Lee Hochstetler).

The root *kònonto/kǎnǎndo(n)* attested in Manding and Mokole is unclear and deserves discussion by specialists. On the contrary, the forms interpreted as the combination of '5+4' in the table below seem to be quite transparent (Table 4.212).

Table 4.212: '9 = 5+4' in Mande

Language	'9'	'5'	'4'
Kyanga	sòòǰí	sóórū	ǰí
Tura	sóísē	sólú	ǰísē
Susu	sólómánáání	súlí	náání
Vai	sōη náání	sóó(?)ú	náání
Bobo Madare	kórónǎ	kóò	nâ

This section, however, is not unproblematic. The Jogo-Jeri non-primary terms for '6-9' are formed by two components. The second (i.e. the terms for 'one', 'two', 'three' and 'four' respectively) is easily recognizable, whereas the etymology of the first (*ma-*) is unclear.

4.10.10 'Ten'

This term is especially interesting in light of the fact that the distribution of the isoglosses of 'ten' served as the basis for Maurice Delafosse's early classification of the Mande languages including the *Mande-tan* and *Mande-fu* groups. These two roots are indeed the main Mande roots with this meaning. However, their distribution does not correspond to the two major branches of Mande as they are distinguished today. The root **tan* is indeed found in all groups of the Western

³¹<https://mpi-lingweb.shh.mpg.de/numeral/Jowulu.htm>

Table 4.213: Mande stems for ‘10’

Manding	*tán	*bí	
Jogo-Jeri	táà(n), ta		
Mokole	tán	*bí	
Vai-Kono	tâŋ		
Susu	*tòngó	fùú	
SWM		*puu	
Bozo-Soninke	tan/téen/cemi		
Bobo		fò	ṃṃ
Dzuun (Samogo)	t(s)eũ/ceũ		
Jowulu			bzĩ/byinŋ
SE-Eastern		*fu/*vu (<* pu)	kwi/kuri, wókòì
SE-Southern		*bù	góó(dō),kòŋ sójólú,

branch except for Bobo and SWM. However, the attestations of the root **pu/fu* are not limited to South-Eastern and extend to a number of the Western branches such as Bobo, SWM, Susu (and possibly Manding-Mokole, assuming that its reflex denotes tens in compound numerals). Isolated forms attested in South-Eastern and in peripheral Western languages are noteworthy.

The reconstruction of **pu/fu* for Proto-Mande and the interpretation of **tan* as the Proto-Western Mande innovation seem well-founded.

The etymology of **tan* is obscure. Its similarity to the locally attested root **tan* (cf. Soninke *tàán* ‘foot, leg’; ‘wheel’; ‘time’ (when counting), Bozo Tieyaxo *tɔn* ‘foot, leg’; ‘time’ (when counting), Bozo Hainyaxo *tã*, Bozo Tiemacewe *tawa*, Bozo Sorogama *taba*) is likely a coincidence. Lexical roots with the meaning ‘foot’ are attested in NC numeral systems, usually as a basis for the non-compound terms for ‘fifteen’. The logic behind this development is simple: ‘ten’ is ‘two hands’, ‘twenty’ means ‘man’, i.e. ‘two hands and two feet’, hence ‘fifteen’ is ‘foot’. This seems to be the case for Boko and Busa, where a non-compound term for ‘fifteen’ (*gèo/ gèro*) is attested (hence ‘16=15+1’ in these languages). This root is etymologically related to ‘foot, leg’ in Duungoma (Samogo) *gě*, Dan *gě*, Mano *gà* (it should be noted that within Mande a non-compound root for ‘fifteen’ is also attested in Ligbi, cf. *tígán / tiga* ‘15’, *tígá-ló* ‘16’).

In addition, a similarity to the term for ‘one’ as attested in some of the languages must be a coincidence.

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A hypothesis assuming a semantic shift *NC **tan* ‘5’ > Proto-Western-Mande *tan* ‘10’ in parallel with the development of the Mande innovation **dúuru/ sóru* ‘five’ seems to be a better explanation.

It bears reminding that the Bokobaru root *kuri* ‘ten’ has a direct parallel in the isolated Bangime language (*kúré*. Cf. also Boko *kúúli* recorded by Koelle).

4.10.11 ‘Twenty’

Table 4.214: Mande stems and patterns for ‘20’

Manding	<‘human’?		
Jogo-Jeri			ʒālāmà/kèlèmó
Mokole	<‘human’?		
Vai-Kono	<‘human’	10*2	
Susu	<‘human’		
SWM	<‘human’?	10*2	
Bozo-Soninke		10*2	
Bobo			kpòró, córò
Dzuun (Samogo)	<‘human’		fwé
Jowulu			kōne/kōnning
SE-Eastern		10*2	kèè-/ka
SE-Southern	<‘human’ ³²	10*2	ɣɔ

There is every reason to believe that the term for ‘twenty’ was based on the lexical root(s) meaning ‘human person’ at the Proto-Mande level. The etymology of some of the isolated forms presented in the table should be sought with this in mind.

4.10.12 ‘Hundred’

The root *keme*, widely attested throughout Western Africa, is noteworthy. Its original semantics deserve a separate study: it is well known that in some languages this root can be used for ‘sixty’ or ‘eighty’ and not for ‘hundred’ (the archaic Bamana counting system: *mànikème* ‘60’, *bámanankème / kème* ‘80’, *kème ní mùgan* ‘100’ (80+20)) (Vydrin & Perekhval'skaya 2015: 360).

³²Mende *núú gbɔyɔngo* ‘20’ (‘person finished’). <https://mpi-lingweb.shh.mpg.de/numeral/Mende.htm>

Table 4.215: Mande stems and patterns for ‘100’

Manding	*kèmé	
Jogo-Jeri	čěmé/tjímí	20*5
Mokole	kème	
Vai-Kono	kεmε	
Susu	kèmé	
SWM	kεmε(η)	Kpelle: <‘head’ (ηwúh)
Bozo-Soninke	kame/keme	‘islam’-60
Bobo		ʃɔ̄(li)/zò(lɛ)
Dzuun (Samogo)		20*5, 80+20
Jowulu		‘rope’*5
SE-Eastern		*20*5
SE-Southern	*kèmé?	kěŋ/kăĩ, la/lú

4.10.13 ‘Thousand’

The roots for ‘thousand’ attested in the Mande languages were borrowed from by the Western African languages. The original meaning of the Mande root *wáa/wága* may be ‘a basket of cola nuts’ (Perekhvalskaja, Vydrin & Perekhvalskaya 2015: 361), cf. Bamana *wágá* ‘panier à colas’, Bobo *wágá* ‘panier qui sert à transporter les colas ou wòlōwágá.’

Table 4.217 gives an overview of Mande forms and patterns that will be used for further comparison to the evidence of other families (Table 4.209).

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Table 4.216: Mande stems and patterns for '1000'

Manding	wúlú/wúli	wáa/wá/wà/wága	bà
Jogo-Jeri	búlí, wúlú (< manding)		
Mokole		wàa/wá/ waga	
Vai-Kono	wúl		
Susu	wúlù/wúli		
SWM	wùlù	wála/wáá	
Bozo-Soninke	gulu	waxa	('islam')-muso, wúdzǔnè
Bobo			
Dzuun (Samogo)		gbà'à, baa	bi 'goat', 800+200, <juula
Jowulu		wa'a'	800+200
SE-Eastern		wàà '200'	200*5, vûù, 'dúú, pàdí, pə, boro
SE-Southern	wúlù/wlǔ/ gblǔ (?)	*wágá: wáá	kpi, ken

Table 4.217: Numerals in Proto-Mande

1	do, kelen	7	wɔ-X-fila ('hand'+2?)
2	pila/fila	8	seki/segí (<'plus'-3?)
3	sakpa/sagba/sawa, ʔààkǔ/yààkǎ?	9	kònono/kònono(n) (10-1, 5+4)
4	náání/nǎǎi	10	pu/fu, tan (< *'5'?)
5	dúuru/sóóru, wo? ko? **tan? (> '10?'), nǔ?	20	<'human'
6	wɔɔ (wɔ-rɔ? 'hand'+1?), t(s)um?	100	kεmε, 20*5
		1000	wulu, wa(g)a

4.11 Mel

A narrow definition of the Mel family is preferred here (in accordance with the classification of the Atlantic languages suggested in (Pozdniakov & Segerer 2017)). This family comprises two compact language groups, namely Northern (Temne, Landuma, and all Baga languages except for Baga Fore and Baga Mboteni, namely Baga Koba, Baga Maduri, Baga Sitemu and others) and Southern (Kisi, Sherbro, Mani, and Krim). Sua, Limba and Gola are not included within the Mel family and are viewed as isolated NC languages. The numeral systems of the two Mel groups comprised of the distant languages are treated separately below.

4.11.1 Southern Mel

Table 4.218: South Mel numerals

	Kisi	Sherbro	Bullom	Mani (Bullom So)	Krim
1	pìlèé/pilɔ, *pum?	bul	(nim)-bul	nìim-búl	yì-mo
2	dín/C-ín/ C-óŋ, danyö	tiŋ	(nin)-tsiŋ/ tiŋ	nìn-cáŋ	yì-yin/ yèèn, díim
3	ŋg-àá/y-àá	ræ	(niin)-ra	nìn-rá	yì-ya/gàà
4	hìsólú	hyol	(nii)-hiɔɔl	nìŋ-nyól/ -nyól	yì-hion
5	ŋùèénú	mɛn	(nii)-man	nìmán < niN-wán?	yì-wɛn/ n-wén
6	5+1	5+1	5+1	5+1	5+1
7	5+2	5+2	5+2	5+2	5+2
8	5+3	5+3	5+3	5+3	5+3
9	5+4	5+4	5+4	5+4	5+4
10	tó	wāŋ	waan	wám	wāŋ/wàn
20	bídii(ŋ)/ bélé	‘finished it is man’	u-tɔɔŋ	ù-tòŋ	<‘person’
100	< Mande	< English		pé, < Susu	
1000	< Mande	< English		< Susu	

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Noun class markers are usually positioned as suffixes in Kisi. However, the first numerical terms in this language have noun class prefixes, which makes the forms look inconsistent, cf. *mùúŋ/ mìíóŋ / ñííóŋ / dííŋ, tííóŋ/là-tííóŋ* ‘two’.

The terms for ‘hundred’ and ‘thousand’ were probably absent in Proto-South-Mel. The similarity between Kisi *tó* ‘ten’ and Bullom-Mani *tòŋ* ‘twenty’ is noteworthy. ‘Twenty’ may follow the pattern ‘20=10PL’. If so, the original *tòŋ* ‘ten’ should be viewed as an early borrowing from Western Mande (**tan* ‘10’). In this case, **wan* ‘10’ is an innovation (probably based on **wan/wen* ‘five’) that developed in South Mel after Kisi had separated. The numeral system of modern Kisi exhibits no significant changes from the forms described by Koelle. It includes the form *ŋam-puum* ‘6’ (Tucker Childs: *ŋòŋpúm*) that may have retained an archaic allomorph of ‘one’ (**pum*). The forms that will be used for further comparison are summed up in the table below (Table 4.219).

Table 4.219: Proto-South Mel numeral system (*)

1	<i>pilè/pilò</i> (< <i>*lɛ/lɔ?</i>), bul, mɔ	7	5+2
2	<i>tsiŋ/tiŋ</i>	8	5+3
3	<i>ra</i>	9	5+4
4	<i>hiɔ</i>	10	5PL?, < <i>*West Mande?</i>
5	<i>wan/wen</i>	20	‘person’, 10PL?
6	5+1	100, 1000	absent

4.11.2 Northern Mel

A higher degree of homogeneity observable in these languages allows an instant reconstruction of their numeral system at the Proto-Northern Mel (Table 4.220)

Table 4.220: Proto-Northern Mel numeral system (*)

1	-in	7	5+2
2	-rəŋ	8	5+3
3	-sas	9	5+4
4	-ŋkile/-nlɛ	10	tɔfɔt (< tɔ-f-ɔt?)/pu, witʃɔ?
5	<i>kə-ʃamaʃ</i> (< <i>*kə-ʃa</i> ‘hand’?)	20	10*2, <i>kə-gba</i> (< <i>*bay/bey</i> ‘chief’?)
6	5+1	100, 1000	absent

4.11.3 Proto-Mel

The table below gives an overview of South Mel and North Mel forms (Table 4.221).

Table 4.221: Proto-Mel numeral system (*)

1	-in, < *lɛ/lɔ?	7	5+2
2	dɪŋ/tsɪŋ/tɪŋ, -rəŋ	8	5+3
3	*tat (> sas, ra)	9	5+4
4	hiɔl, -ŋkɪlɛ/<-nlɛ?	10	*pu/fu, 5PL?
5	wan/wen, <'hand'	20	'person', 10PL?
6	5+1	100, 1000	absent

4.12 Atlantic

Our step-by-step reconstruction of numeral systems in the Atlantic languages will be based on their classification suggested in Pozdniakov & Segerer 2017 (forthcoming) that distinguishes two main groups within the Atlantic family, namely Northern and Bak.

4.12.1 Northern

The numeral systems of Northern Atlantic are treated below by sub-group.

4.12.1.1 Cangin

Table 4.222: Proto-Cangin numerals (*)

1	no	7	5+2
2	nak	8	5+3
3	haj/ʔéeyə	9	5+4
4	nik-il < *nak-il?	10	sabbo (< Fula), da:ŋkah
5	jat (<'hand'), ʔi:p	20	10*2
6	5+1	100, 1000	< Wolof? Fula?

Some of the reconstructions presented above are not immediately apparent and are in need of additional commentary. A detailed discussion of each of them

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would be impossible here, so we will take the reconstruction suggested for ‘four’ (*nik-il*) as a sample.

At first glance, the forms of ‘four’ attested in the Cangin languages have nothing in common. Two of the five Cangin languages have *kinil* ‘four’ (Ndut-Palor), whereas in the remaining three (Laala, Noon, and Safin) *nikis* is used in this function. The easiest solution to the problem would be to postulate two alternative forms for this group. However, as the evidence of comparative-historical phonetics suggests, the final -l in Ndut-Palor regularly corresponds to the final -s in Laala-Ndut-Safin (Table 4.223).

Table 4.223: l ~ s regular correspondence in Cangin

*-l	‘eye’	‘black’	‘road’	‘four’
Ndut	ʔil	suul	wal	kinil
Palor	ʔil	suul	waal	kinil, enil
Laala	kɔs	*susus	was	nikis
Noon	kwas	*sujus	waz	nigis
Safin	xas	*suzus	was	nikis

This fact alone urges closer examination of the forms quoted above. Further analysis shows that a fossilized noun class prefix *kV-* is present in some of the Palor numerals, cf. *ka-nak* ‘deux’, *ke-jek* ‘trois’, *ki-nil* ‘quatre’, *kip* ‘cinq’. At the same time, the suffix *-Vs* is observable in the Noon numerals, cf. *jet-us* ‘five’. This evidence combined suggests the following development of the forms for ‘four’ (Table 4.224).

Table 4.224: Development of **nik-Vl* ‘4’ in Cangin

Proto-Cangin	* nik-Vl		
Laala/Noon/Safin	* nik-Vs		nikis
Ndut/Palor	* ki-nik-Vl	ki-nik-il	kinil

4.12.1.2 Nyun-Buy

Numerical terms are highly divergent within this sub-group, so it seems reasonable to treat them by branch (Table 4.225).

Table 4.225: Nyun-Buy numerals

	Nyun	Buy (Kobiana, Kasanga)
1	duk	tee(na), -anɔʔ
2	nak	naŋ
3	lal	taar
4	ren(d)-ek	sannaŋ
5	ci-lax (<'hand'), -mækila	ju-roog (<'hand'?)
6	5+1	5+1
7	5+2	5+2
8	5+3	4+4
9	5+4	5+4
10	ha-lax (<'hands')	5PL, ntaajã
20	<'king'	< Mande, 10*2
100	< Mande	< Mande, < French
1000	< Mande	ŋ-kontu < Portuguese ³³

The pattern '5'='hand' ~ '10'='hands' is immediately apparent in Nyun. In the case of Buy, it can be accepted only under the assumption that the derived term for 'five' became phonetically distant from its source form, cf. Kasanga *ji-rek*, Kobiana *ji-hak* 'hand' (these forms must be related to Nyun *ci-lax* 'hand'). In any case, the Kasanga term *ŋaa-roog* follows the pattern '5PL' that uses the same plural noun class as the one attested in *ŋa-rek* 'hands'.

The forms for 'ten' attested in Joola Ejabat (Atlantic Bak) *si-ntaaja* is important for the diachronic interpretation of the Kobiana form *ntaajã*. The evidence suggests that the latter was probably directly borrowed from Joola³⁴ (as was *-anɔʔ* 'one').

4.12.1.3 Jaad-Biafada

The forms of 'one' (*ni/ nɛ*) are distinguishable in the compound numerals, cf. Jaad *ŋka-inɛ* '6' ('5+1'), Biafada *mpaaji nyi* '7' ('6+1'), etc. The term for 'five' goes back to the lexical root meaning 'hand' (Biafada *gə-bəda*, Jaad *ko-bəda*).

³³Guillaume Segerer (p.c.).

³⁴According to Guillaume Segerer (p.c.) it is possible that the Ejabat and Kobiana forms both come from Manjak.

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Table 4.226: Jaad-Biafada numerals

1	nnəm̩ma, *ɲi/nɛ/-inɛ, -kkā	7	5+2, 6+1 (< Manjak)
2	ke, ma-ae	8	5+3, wose/wase
3	jo/tfaw	9	5+4, leberebo
4	n(n)e/nnihi	10	(p)po
5	bəda (<'hand')	20	10*2
6	5+1, paaji (< Manjak), ɲka-?	100, 1000	< Fula

4.12.1.4 Tenda

The reconstruction of the Proto-Tenda numerals (Pozdniakov 2016) is based on a comparative analysis of five Tenda languages: Basari, Tanda, Bedik, Bapen, Konyagi.

Table 4.227: Tenda numerals (*)

1	bat, ndi/riye/diye/iye, mbo	7	5+2
2	ki	8	5+3
3	taɗ	9	5+4
4	næx	10	poxw
5	mbəd (<'hand'), cɔ/njɔ	20	10*2
6	5+1	100, 1000	< Fula, < Mande

The etymology of the Konyagi term for 'five (*mbəd*)' is based on the Jaad-Biafada evidence (these languages belong to the same sub-group as Tenda).

4.12.1.5 Fula-Sereer

The numerical terms are highly divergent within this sub-group, so it seems reasonable to treat them by language (Table 4.228).

The fact that the Seerer terms covering the sequence from 'two' to 'five' have the same final segment is noteworthy. This could potentially be interpreted as a special morpheme or as a sub-morpheme that resulted from alignment by analogy. This discussion will be resumed below. Here it can only be stated that the

³⁵Reviewing my first version of the book, Guillaume Segerer has advanced a new interesting etymology for Fula: *jow-i* '5' = *jun-ngo* <*jow-ngo* 'hand'. His hypothesis is quite possible.

Table 4.228: Fula-Sereer numerals

	Fula	Sereer
1	goʔo	leŋ
2	difi	dik
3	tati	tadik
4	na(y)i	nahik
5	jo(w)i ³⁵	ḡe-tVk
6	5+1	5+1
7	5+2	5+2
8	5+3	4+4
9	5+4	5+4
10	sapp-o	xarḡ-
20	noogas/noogay	10*2
100	teeme-	< Fula
1000	< Mande, < Hausa	< Wolof?

morphological analysis of the Sereer term for ‘five’ (*ḡe-tVk*) suggested in the table below is not immediately apparent and is thus debatable. Within this approach the element *ḡe-* is interpreted as a noun class prefix despite the fact that such a class is lacking in Sereer. Complex issues pertaining to the reconstruction of the term for ‘five’ will not be treated here. We shall only note that the plural animate class is reconstructable as *ḡe-* (class 2) in Proto-Fula-Sereer.

4.12.1.6 Wolof

Table 4.229: Wolof numerals

1	CL-enn	7	5+2
2	ñaar (< *CL-(X)aar)	8	5+3
3	ñ-ett (< *CL-(X)ett)	9	5+4
4	ñ-ent (< *CL-(X)en(i)t)	10	fukk
5	jurom	20	< ‘person’, 10*2
6	5+1	100, 1000	< Fula, < Mande

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The Wolof term for ‘one’ exhibits the agreement in noun class, cf. *k-enn nit* ‘one person’, *g-enn garab* ‘one tree’, *f-enn* ‘somewhere’, *l-enn* ‘something’, etc. The same can be applied to the terms covering the sequence from ‘two’ to ‘four’ as demonstrated in Pozdniakov 2015: 82. Nothing is known about the original radical of the root (assuming there was one) since it was replaced by a noun class consonant.

Speaking of ‘twenty’, it should be said that the form *nit(t)* (apparently related to the lexical root *nit* ‘person’) is widely used alongside the common Wolof pattern ‘10*2’.

4.12.1.7 Nalu-Baga Fore-Baga Mboteni

This sub-group is the most problematic within Northern Atlantic. Admittedly, the evidence pertaining to their classification as Northern is inconclusive. Moreover, the sub-group itself is highly heterogeneous, which affects its numeral systems as well. The pertinent data for each of these languages is provided below (Table 4.230).

Table 4.230: Numerals in Nalu, Baga Fore and Baga Mboteni

	Nalu	Baga Fore	Baga Mboteni
1	de:ndik	ki-ben	mbó
2	bi-lɛ	ci-di	sà-lé
3	p-aat	ci-tɛt	n-dér
4	bii-naaŋ	ci-neŋ	í-nà
5	teedoŋ (< té ‘hand’?)	su-sa(n)	ì-rìβě, *ba(x)?
6	5+1	5+1	5+1
7	5+2	5+2	5+2
8	5+3	5+3	5+3
9	5+4	5+4	5+4
10	5*2, *a-lafaŋ?	ɛ-tɛ-lɛ (< ‘hands’ +2)	tèn (< ‘*hand’?)
20	10*2	10*2	10*2
100	m-laak	bɔ-1	< Mande
1000	m-paak (100pl?) < Susu	tɛngbeŋ-1	?

4.12.1.8 Proto-Atlantic North

The prospects for the reconstruction of the Proto-North Atlantic numerals are discussed below.

4.12.1.8.1 ‘One’ (Table 4.231)

Table 4.231: Numerals for ‘1’ in Northern Atlantic

Cangin		no		
Nyun				duk
Buy		nɔʔ		tee(na)
Jaad-Biafada	*ɲi/nɛ			nnəmma,pakkã
Tenda	di(ye)		mbɔ	bat
Fula-Sereer	leɲ			goʔo
Wolof	-enn			
Nalu	deendik		mbó	ki-ben

Isolated forms are quoted in the rightmost column. Direct parallels to some other forms are attested in Cangin – Buy (*nɔʔ*) and Konyagi – Baga Mboteni (*mbɔ*). The most common root is **di(n)/ li(n)/ ye(n)/ ne(n)* (assuming that these forms are related).

4.12.1.8.2 ‘Two’, ‘Three’ and ‘Four’ (Table 4.232)

Table 4.232: Numerals for ‘2’-‘4’ in Northern Atlantic

	‘2’	‘2’	‘2’	‘2’	‘3’	‘3’	‘4’	‘4’
Cangin	nak					haj	nik-il < nak-ilʔ	
Nyun	nak				lal			ren(d)-ek
Buy	naɲ				taar			sannaɲ
Jaad-Biafada			ke			jo/caw	n(n)e(hi)	
Tenda			ki		taɖ		næx	
Fula-Sereer		ɖik			tati(k)		na(y)i(k)	
Wolof				X-aar	X-ett		X-en(i)t	
Nalu		di/le			tet/tat		naaɲ/nɛɲ/na	

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The forms of ‘two’ in Tenda-Jaad-Biafada can be explained as a shared innovation, since these two branches belong to the same sub-group. The forms quoted in the two leftmost columns could be related, but the pertinent evidence is inconclusive. The roots **nak* and **di(k)* are reserved for further comparison.

As in the majority of other NC branches, the terms for ‘three’ and ‘four’ (tentatively recorded as **taɬ* ‘3’ and **nak* ‘4’) are fairly consistent in North Atlantic. Thus it appears that the terms for ‘two’ and ‘four’ are the same (or phonetically similar) across the languages of this branch. Cangin is the only language that does not comply with the additional distribution, because in the case of Cangin both terms are reconstructed as **nak*. Interestingly, the form of ‘four’ bears a suffix, hence it could potentially be explained as a derivative of ‘two’. At the same time, the root *nak* ‘four’ is reminiscent of one of the most persistent NC roots with this meaning.

In Jaad-Biafada we find the root **jow/caw* ‘3’. This is undoubtedly an innovation in the group which is represented by a remarkable isogloss. This is therefore an argument in favour of interpreting this group as part of the northern branch of the Atlantic family: Biafada *-njo / bí-co/ bí-yo* ‘3’, Jaad *ma-cao/ ma-caw/ má-cɔu* ‘3’. It is possible that we are dealing with an ancient borrowing of Proto-Jaad-Biafada from Mande (from *saba* ‘three’).

In theory, it is possible that forms attested in the Cangin languages (*ka-hay / *ʔe-jeʔ*), also originated from the Mande form (likely weakened to **habi / hawi*).

In this case, we find either reflexes of the Proto-NC form **tath* or borrowings (taking into account very ancient forms) – from the Mande languages in numerous Northern Atlantic languages.

4.12.1.8.3 ‘Four’

The root **na(h)i-k* can be securely reconstructed for Proto-Northern Atlantic. As has been demonstrated above, the initial *ñ-* of the Wolof term is a reflex of a noun class prefix that replaced the initial radical of the root. The final *-t* in the Wolof term probably resulted from the alignment by analogy with the term for ‘three’ that ends in *-t*, cf. **ñ-eenk ? → ñ-eent* ‘4’ by analogy with *ñ-ett* ‘3’.

4.12.1.8.4 ‘Five’ (Table 4.233) and the terms from ‘six’ to ‘nine’

The North Atlantic languages are characterized by the term for ‘five’ being systematically derived from the lexical root meaning ‘hand’. Interestingly, this development seems to post-date the replacement of the original root for ‘hand’ by

Table 4.233: Numerals for ‘5’ in Northern Atlantic

Cangin	jat (<‘hand’)		ʔi:p	
Nyun	ci-lax (<‘hand’)			-mækila
Buy			ju-roog	
Jaad-Biafada	bəda (‘hand’)			
Tenda	mbəd (<‘hand’?)	co/njo		
Fula-Sereer		jo(w)j	* ʃe-tVk	
Wolof		jurom		
Nalu	teedoŋ/*tee (‘hand’?)		ribə(l)	su-sa(n), *ba(x)?

an innovation in the majority of the branches. At least four independent formations of this kind are attested within eight branches (cf. the evidence quoted in the leftmost column of the table). Both Tenda and Jaad-Biafada terms for ‘five’ are of common ancestry: they seem to have developed from the root **bada* at the Proto-Jaad-Biafada level, since both languages belong to the same sub-group. This probably indicates that the pattern based on the term for ‘hand’ was used in the languages that belong to the Northern group at the proto-level (possibly as an alternative to the inherent NC root for ‘five’). In view of this, the formal alterations of ‘five’ are easily explained as those automatically caused by the replacement of the inherent term for ‘hand’ by an innovation. As we hope to demonstrate in the next chapter, the derivational pattern ‘hand’ > ‘five’ is surprisingly rare in the NC languages. It is barely attested, for example, in Benue-Congo, thus being characteristic of the North Atlantic languages (and the Atlantic languages on the whole, see below).

In view of this, the reflexes of the inherent NC root for ‘five’ could have been preserved in only a minority of North Atlantic branches. The roots **jo/ co*, **tVk/ rog* and **rib/ ʔi:p* unrelated to the term for ‘hand’ deserve special attention within this context.

The pattern ‘5+’ (‘hand’+) can be securely reconstructed for the terms covering the sequence from ‘six’ to ‘nine’. The uncommon pattern ‘7=6+1’ attested in Biafada was borrowed from one of the Manjak languages (Atlantic Bak), as was the derived term for ‘six’ (*mpaaji*).

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4.12.1.8.5 ‘Ten’ and ‘Twenty’ (Table 4.234)

Table 4.234: Numerals and patterns for ‘10’ and ‘20’ in Northern Atlantic

	‘10’	‘10’	‘10’	‘20’	‘20’	‘20’
Cangin			< Fula, da:ŋkah	10*2		
Nyun		<‘hands’			<‘king’	
Buy		5PL	ntaajã	10*2		< Mande
Jaad-Biafada	(p)po			10*2		
Tenda	pəxw			10*2		lapem
Fula-Sereer			sapp-o, xarɓ-	10*2		noogas/ noogay
Wolof	fukk			10*2	‘person’	
Nalu		5*2	*a-lafaŋ?	10*2?		

With the evidence of the three branches, the reconstruction of the term for ‘ten’ (tentatively recorded as **pok*) seems secure. Its attestations are admittedly limited, apparently due to its replacement with derived terms based on ‘five’ (‘hand’). This reconstruction is also supported by the presence of the final velar: as we have seen, it is reconstructable in a number of other numerical terms at the proto-level.

The pattern for ‘twenty’ is reconstructable as ‘20=10*2’. Particular derivatives based on the typologically widely attested patterns (‘20’ <‘person’, 20 <‘king’) seem to have formed independently.

4.12.1.8.6 ‘Hundred’ and ‘thousand’

The evidence points to the absence of these terms in Proto-North Atlantic. Attested forms are borrowings from ‘influential’ languages such as Fula, Wolof, Manding, Hausa (in the case of Niger Fulfulde). Interestingly, the terms in question are already borrowings in some of these source-languages.

4.12.1.8.7 Proto-North Atlantic numeral system (Table 4.235)

Table 4.235: Proto-North Atlantic numeral system (*)

1	di(n)/li(n)/ye(n)/ne(n), mbɔ	7	5+2
2	di(k), nak	8	5+3
3	taɟ	9	5+4
4	nak	10	pok
5	<'hand', jo, tVk/rog, rib/?i:p	20	10*2
6	5+1	100, 1000	absent

4.12.2 Bak

4.12.2.1 Joola languages

Over a hundred sources covering the numeral systems of fifteen major Joola dialects have been made available to us courtesy of Guillaume Segerer. His collection of evidence may be labeled a 'dialect atlas' of numerical terms. These terms often exhibit significant variations not only in their phonetics but in the inventory of lexical roots as well.³⁶ The name Joola pertains to a group of at least seven related languages (including Bayot). A study of their numeral systems may help set a clearer distinction between these languages. Moreover, it might shed some light on their (hitherto unclear) internal classification.

Numerical terms as attested in ten major Joola languages are discussed below.

4.12.2.1.1 'One' (Table 4.236)

The main form is reconstructed as **-anor*, with the initial vowel forming a part of the root. The only languages where this root is not present are Bayot (*don* '1') and Kwaatay (*fɛnɛŋ* '1'). The root *əkon* with a vocalic opening (sporadically attested in Kasa and Bayot) is found in Fogny alongside **-anor*.

4.12.2.1.2 'Two', 'three' and 'four' (Table 4.237)

Two alternative roots for 'two' are attested in Joola, namely **si-ɬubə?* and a relatively wide-spread **si-gaba?*

³⁶I wish to express my gratitude to G. Segerer for his assistance with regard to the dialectal attribution of sources.

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Table 4.236: Joola numerals for '1'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
-anɔʔ	-anor	-anor	-anor	
-anor	-anor (akon) (ta)	-anor əkon	-anor	(akon) don fɛnɛŋ
			yinka, (sia)	

Table 4.237: Joola numerals for '2'-'4'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
'2'				
si-lubəʔ	si-ɫubɤʔ	(liba)	si'subə	ʔi- rigəʔ/tɪgga
si-rubə	sɪ-subəl	su-supək/ ɕi-ɕipək ^h	si-lu:bəʔ	si'subə
'2'				
si-gabaʔ	si-gäbä, (ku-menten)	si-gäbäʔ	si-gäbä	
'3'				
si-həəji	si-hɤ:ʒiʔ	si-feegiir/ si-fe:ʒiʔ	sɪ-hə:ʒɪ	i-fiigiʔ/ i-fəəʒi
gu-fu:ɡur/si-fɤʒir	sɪ-hə:ʒul	si-hə:ci:l	si-həəji, (fu-foateen)	ki-hɤ:ʒiʔ
'4'				
si-bäkir	si-bä:kiʔ/si- bäkiʔ	si-bäkir/ si-ba:ci:r	si-bacir	sɪ-bəyɪr
si-baagir	sɪ-bacul	ɕɪ-päkil/ si-ba:ci:l	si-bäkir	ki-bäkir

The term for ‘three’ goes back to **si-feegir*, with its reflexes being attested in all dialects.

The term for ‘four’ is securely reconstructed as **si-bääkiŋ*.

4.12.2.1.3 ‘Five’ and ‘ten’ (Table 4.238)

Table 4.238: Joola numerals for ‘5’ and ‘10’

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
‘5’				
hu-tək	hu-tək ^h	fu-tək/u-sək	hu-tək	o-to/ɔ-ɬ/ ɔ-rɔ
fu-tək		ɪ-çäk ^h /i-sak	fu-tək/ hu-ʒok	hu-tək
‘5’				
	(naa-suan) ŋaa-suwan			
‘5’				
		*fu-tam		
*tən				
‘10’				
ku-ŋɛn <‘hands’ gu-ŋɛn <‘hands’	ku-ŋɛn <‘hands’	ku-ŋɛn <‘hands’	ku-ŋɛn <‘hands’ ku-ŋɛn <‘hands’	
‘10’				
	sɛ-bɛɛs <‘hands’	ŋaa-suwan		gu-tie(pəkɔ) <‘hands’ su-moŋu/ su-ŋɔmu <‘hands’

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The Banjal form **tən* (reconstructed on the basis of the compound numerical terms) and the (related?) Fogny form *fu-tam* attested in a source dating to the seventeenth century (d’Avezac 1845) are of special interest.

The Mlomp form of ‘five’ (sporadically attested in Kasa as well) is identical to the Karon form for ‘ten’ (*ḡaa-suwan* in both cases). The etymology of these forms is unclear. At the same time, the majority of the forms for ‘ten’ (but not for ‘five’ as in the majority of the North Atlantic languages) go back to the lexical root meaning ‘hands’. To illustrate this point, the lexical stems for ‘hand’ in the Joola languages are quoted in the table (Table 4.239).

Table 4.239: Joola stems for ‘hand’

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
‘hand’ ka-ḡen(ak)	ka-ḡen	ka-ḡen(ak)/ ka-ḡen	ka-ḡen	
ga-ḡen/ ka-ḡen(ak)		ka-ḡen	ka-ḡen(ak)	ka-ḡyen(ak)
‘‘hand’’ ε-pes	e-bees ε-bees	ε-pes/ε-bees		
‘hand’				ε-mḡu/ ε-ḡomu
‘hand’	ka-seʔ			ka-te/ga-te/ te/kə-se
‘hand’ bu-leḡej		ε-leces		
‘hand’ bi-leḡej		‘upper arm’	bu-lefec	
‘hand’			‘inner hand’	
ka-ḡeḡum(əku)			kə-ləḡum	
			‘hand’	

As can be deduced from the presentation above, at least four lexical roots for ‘hand’ that serve as a basis for the terms for ‘ten’ are distinguishable in Joola. Interestingly, the source roots and the numerical terms that depend on them are not necessarily the same within a language. The main root is **ku-ŋen/ ku-ŋen* ‘10’ <‘hands’. At the same time, *bɛɛs* ‘hand’ yields *sɛ-bɛɛs* ‘ten’ in Mlomp. This derivative is not attested in Kasa and Karon where *bɛɛs* ‘hand’ alternates with *ŋen/ ɲen* ‘hand’. The base **ka-tɛ* ‘hand’ attested in Bayot and Kasa yields *gu-tie-* in Bayot. Finally, *ɛ-mɔŋu* ‘hand’ > *su-moŋu* ‘ten’ in Kwaatay (also *ɛ-ŋɔmu* ‘hand’ > *su-ŋɔmu* ‘ten’ with a metathesis).

As noted above, the root *ɛ-ntaaja* attested in Keeraak and Ejamat was possibly incorporated into Kobiana (North Atlantic). This root, admittedly very rare in the Joola cluster, is the only primary one for ‘ten’ and as such it deserves special attention (especially in view of its later replacement with the derivatives based on ‘hand’).

4.12.2.1.4 ‘Twenty’, ‘hundred’, and ‘thousand’

Two apparent derivational patterns are used for the term for ‘twenty’ in the Joola languages:

<‘king’: Bliss *a-yuy*, Banjar *ɔ-vi/ɔ-vvi*, Kasa *a-yi/ ɔ-ji*, Karon *ɔwi*, Bayot *ɔ-y*;

<‘person’: Kasa *an / bu-k-an*, Fogny *ka-banan* ‘person finished’.

In Kwaatay the term for ‘twenty’ is based on ‘mouth’ (*bu-tum-an*).

The terms for ‘hundred’ and ‘thousand’ are borrowings from Mande or ‘influential’ Atlantic languages (often either Fula or Wolof) in the majority of the dialects, cf. *keme/teme* ‘100’, *wuli, juni* ‘1000’.

In conclusion it should be added that the Joola terms covering the sequence from ‘six’ to ‘nine’ follow the common pattern ‘5+’.

4.12.2.2 Manjak languages

This branch is represented by three closely related languages (Manjak, Mankanya, Pepel). Numerical terms attested in them are presented in the table below (Table 4.240).

As can be gleaned from the table, the Manjak stems for numerals are very different from those attested in Joola. At the same time, morphological and lexical evidence strongly suggests that these two branches are genetically the closest and belong to the same Bak sub-group.

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Table 4.240: Manjak numerals

1	lɔɔl(e)/lɔŋ	7	6+1, jand/jaan?/ cand (Pepel)
2	-təb/-təw, -pugut/pugus (Pepel)	8	4PL, koas/ʊʌs
3	wa-(y)ant/wa-jent/ jens	9	10-1, (8+1)
4	baakər/wakər	10	5PL ('hands'), (n)taaja/taaya, taim (Pepel)
5	ɲɛɛn ('hand')	20	10*2
6	paagi/paaji	100	< French
		1000	kɔnt

This implies that the numeral system of one of these branches must have undergone systematic innovations. We will reserve our conclusions until the evidence from the other Bak sub-groups, i.e. Balant and Bijogo, is reviewed.

4.12.2.3 Balant

Despite the fact that Balant is usually treated as one language, we will present the evidence of Balant Ganja and Balant Kentohe separately (Table 4.241), because the difference between these two idioms is of key importance to our study.

The opening sequence of the Ganja terms is quoted according to Creissels & Biaye 2015. They form the most reliable part of the presentation. A few remarks pertaining to the differences in these Balant dialects are in order. First of all, the Balant Kentohe terms for 'one', 'two', 'three' and 'six' exhibit a final homorganic nasal of uncertain origin. The forms attested by Koelle in the 19th century sources suggest that we are dealing with a morpheme **-n** not assimilated to a preceding consonant by point of articulation. Secondly, Koelle's evidence speaks in favor of 'six' being a base for a larger group of numerical terms. According to him, not only 'eight' and 'nine' but also 'ten' followed the pattern '6+'.

4.12.2.4 Bijogo

Let us examine an analysis of the Bijogo numeral system found in (Seeger 2002). According to him, the term for 'one' is *nɔɔd* ("cette forme est retenue pour l'énumération abstraite", *ibid.* 171). His interpretation of *-d as the only true reflex of the etymon (with other segments ensuring the grammatical agreement) is immediately convincing, cf. the following examples quoted by him (*ibid.* 171):

Table 4.241: Balant numerals

	Balant Ganja	Balant Kentohe
1	hódà/wódà/-ɔdaʔ, bóódííbó/wóódííbó (counting)	-ɔɔdn/ho:dn/fóóda
2	síbí/-sebe	-sibm/-sebm/g-jííbn (Koelle 1963[1854])
3	hàbí/yààbíí	-habm/káábn (Koelle 1963[1854])
4	tállá/tàhàlā	-tasla/tahla/tájiila (Koelle 1963[1854])
5	jüíf/jéèf	ciɸ/'-cef/kiif ~ ciif (Koelle 1963[1854])
6	fááj/faac	mfaacɸ/faad (Koelle 1963[1854]), 5+1
7	6+1	6+1, 5+2
8	táhtállà/tāntàhlā (4 redupl.), 6+2	5+3, 6+2 (Koelle 1963[1854])
9	jíntállá/jíntàhlā (5+4)	5+4, 6+3 (Koelle 1963[1854])
10	jímín/jínmínn (<5?)	ciɸmun/f-cef meen (<5?), 6+4 (Koelle 1963[1854])
20	10*2	<'person'
100	gèmé/keme (borrowed)	<'5 persons'
1000	wílí (borrowed), kont	f-ko:nti

- (2) a. *o-to ɔ-nɔɔd* 'a person'
 b. *e-booɸi ɛ-nɛɛd* 'a dog'
 c. *u-gbe u-nɛɛd* 'a road'
 d. *ka-jɔkɔ n-ka-d* 'a house'
 e. *ɲɔ-katɔ ɲ-ɲɔ-d* 'a fish'.

Segerer justly observes that 'La forme générale de l'élément ayant pour valeur 'un (autre)' est donc (V)-n-pC-d, où pC est le préfixe de classe du nom déterminé' (ibid. 171).

He also quotes the form *dideeki* 'seul' (var. *deeki* 'tout seul'). A variant of this form probably appears as *èdígé/ néédigé/ módiige* 'one' in Wilson and Koelle.

As demonstrated by Segerer, the term for 'three' (*ɲ-ɲɔkɔ*) is a Bijogo innovation of a cultural origin, cf. SG *ɲɔ-ɔkɔ* - PL of *nɔ-ɔkɔ* 'finger' (dim. <*kɔ-ɔkɔ* 'hand'):

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Table 4.242: Bijogo numerals

	Bijogo Kagbaga (Bubaque)	Bijogo (other dialects)
1	n-ɔɔd (*-d)	
2	n-somb (Segerer, p.c.), n-sombɛŋ	sòòbɛ́/súngb/cuuwɛ, ndank (Kamona)
3	ɲ-ɲɔ-ɔkɔ (<'fingers')	
4	ya-agenɛk	
5	n-de-ɔkɔ (dɛ 'to finish', -ɔkɔ 'hand')	nu-duɓ-ɔkɔ (Kamona)
6	5+1	
7	5+2	
8	5+3	
9	5+4	
10	n-ruakɔ (ru 'to rise', -ɔkɔ 'hand')	
20	o-joko ('person'), -ansak-o-to ('to finish'+ 'somebody')	ɲɔjɛt oto (Kamona), Koelle 1963[1854]: ríakɔ́to/ɲórembaʃóoto
100	20*5	
1000	kuntu	

'Un roi bijogo ne se déplace jamais sans l'attribut symbolique de sa fonction, constitué par une sculpture de bois et de corne ... Cet objet, nommé u-ran kɔ-ɔkɔ, représente une main à trois doigts' (ibid. 172). It should be noted that this root is attested in all Bijogo dialects and is already accounted for by Koelle (-ɲɔ́ɔ́gɔ).

As established by Segerer, the same root is attested as ɔkɔ in the terms for 'five' and 'ten'.

4.12.2.5 Proto-Bak

Now we will compare the Bak numerals.

4.12.2.5.1 'One' (Table 4.243)

A comparison of the terms quoted in the leftmost column yields the form that can be tentatively recorded as **don*. The rightmost column gives an overview of roots attested in only one out of four branches.

Table 4.243: Bak numerals for ‘1’

Joola	don	-anor, əkon, fɛnɛŋ, yinka, (sia), (ta)
Manjak	lɔl(e)/lɔŋ	
Balant		-ɔdaʔ
Bijogo	*d	-ɛdʒɛ

4.12.2.5.2 ‘Two’ (Table 4.244)

Table 4.244: Bak numerals for ‘2’

Joola	si-ʔubəʔ	si-gabaʔ
Manjak		-təb/-təw, pugʉ/pugus
Balant	sibu/-sebe	
Bijogo	sòòbɛ́/súngb/cuuwɛ	

The leftmost column presents the root attested in three sub-groups. It is traceable to *ʔubəʔ.

4.12.2.5.3 ‘Three’ and ‘four’ (Table 4.245)

Table 4.245: Bak numerals for ‘3’ and ‘4’

	‘3’	‘4’	‘4’
Joola	si-feegir	si-bääkiʔ	
Manjak	wa-(y)anʔ/wa-jenʔ/jens	baakər/wakər	
Balant	habi/yabi		tasala/tahala
Bijogo	ɲ-ɲɔ-ɔkɔ (< ‘fingers’)		ya-aɣɛnɛk

For the first time in our step-by-step analysis of numeral systems in the numerous NC families we observe the existence of a separate root for ‘three’ in each of the branches of a language group.

The term for ‘four’ exhibits an isolated Joola-Manjak innovation as well as isolated innovations in Balant and Bijogo.

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4.12.2.5.4 ‘Five’ (Table 4.246)

Table 4.246: Bak numerals for ‘5’

Joola		fu-tək, tən?, ɲaa-suwaŋ? (cf. ‘10’)
Manjak	ɲɛn (‘hand’) (cf. Joola ‘10’)	
Balant		ʝiif/jéèf
Bijogo	n-de-ɔkɔ (de ‘to finish’, -ɔkɔ ‘hand’)	

The pattern ‘hand’ > ‘5’ is traceable within two branches. However, the roots involved are different in each case. Numerous isolated forms are grouped together in the rightmost column.

4.12.2.5.5 The terms from ‘six’ to ‘nine’ (Table 4.247)

Table 4.247: Bak numerals and patterns for ‘6’-‘9’

	‘6’	‘6’	‘7’	‘8’	‘9’
Joola	5+1		5+2	5+3	5+4
Manjak		paagi/paaji	6+1, jand/jaan?/cand	4PL, koas/ɔʌs	10–1, (8+1)
Balant		fááj/faac	6+1	4 redupl., 6+2	6+3, 5+4
Bijogo	5+1		5+2	5+3	5+4

The form **paag/paaj* ‘six’ is a common Manjak-Balant isogloss.³⁷ It is not surprising that the primary term for ‘six’ attested in these languages served as the basis for the ‘7=6+1’ pattern. This pattern received further development in Balant where it was employed for terms up to ‘ten’ (i.e. ‘10=6+4’) according to the 19th century sources. At the same time, the archaic pattern ‘8=4PL’/‘8=4 redupl.’ is attested in these languages alongside the pattern ‘8=6+2’.

³⁷Guillaume Segerer is right to note (p.c.) that the Manjak-Balant form **paag-* ‘6’ may be related to Joola **-feegir/-həɔji* ‘3’

4.12.2.5.6 ‘Ten’ (Table 4.248)

Table 4.248: Bak numerals for ‘10’

Joola	ε-ntaaja ³⁸	ku-ηen/ηen ‘hands’	‘hands’ (bεεs, moηu/ηomu, tie)	ηaa-suwan
Manjak Balant Bijogo	(n)taaja/ taaya		5PL (‘hands’) n-ruakɔ (ru ‘to rise’, -ɔkɔ ‘hand’)	taim jimmín, 6+4

In addition to the common pattern ‘10 = ‘hands’’, both branches share a common root (*ntaaja*) that could be interpreted as a shared Proto-Joola-Manjak innovation.

4.12.2.5.7 ‘Twenty’, ‘hundred’ and ‘thousand’

The term for ‘twenty’ is based on the lexical root meaning ‘person’ in all of the branches (except for Manjak, where it was replaced with the pattern ‘20=10*2’). The same development is observable in Balant Ganja as well.

The terms for ‘hundred’ and ‘thousand’ are most likely borrowings. However, the origin of *kont/kunt* ‘thousand’ attested in three of the Bak branches deserves special discussion (in North Atlantic this root (*η-kontu*) is found in both of the Buy languages).

³⁸The stem is attested only in Joola Feloup, so, it seems to be borrowed from Manjak.

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4.12.2.5.8 Overview of the Bak numerical terms (Table 4.249)

Table 4.249: Bak numerals

1	don/lɔŋ, -anor, əkon	7	6+1, 5+2, jand/jaanʔ/ cand (Pepel)
2	ʔubəʔ, -təb/-təw, -pugut/pugus	8	4PL/4 redupl., ʊʌs
3	feegir, yantʔjentʔ, habi/yabi	9	5+4, 10-1, 6+3
4	baakər/wakər, tasala/tahala	10	5PL ('hands'), (n)taaj, taim, -suwan
5	'hand', tək, tənʔ	20	'person', 10*2
6	paag/paaj, 5+1	100	borrowed
		1000	kɔnt (borrowed?)

4.12.3 North Atlantic and Bak Atlantic numerals in the comparative perspective

It should be stressed that the Atlantic family is among the most divergent within Niger-Congo. Some of the numerical terms in both of the Atlantic groups exhibit a variety of forms potentially explained as Proto-NC reflexes. Moreover, the comparative evidence presented in Tables 4.227 (Proto-North-Atlantic) and 4.241 (Proto-Bak-Atlantic) points to the near total absence of common roots present in both groups. The only exception to this is the root *tək/ tVk* 'five'.

In view of this, the only available solution would be the study of the Atlantic evidence within a wider NC context (i.e. in contrast to the reconstructions available for other NC families). A comparison of the intermediate reconstructions within the macro-family will be offered in the next chapter.

4.13 Isolated languages vs. Atlantic and Mel

According to the traditional classification outlined in Sapir 1971, Limba, Sua and Gola belong to the Atlantic languages. However, as we tried to demonstrate in Pozdniakov & Segerer 2017 (forthcoming) this hypothesis is as ill-grounded today as it was half a century ago.

An overview of the pertinent data for each language is presented in the tables below.

4.13.1 Sua

Table 4.250: Sua numerals

1	sɔn	7	5+2
2	cen	8	5+3
3	b-rar	9	5+4
4	b-nan	10	tɛŋi
5	sɔŋgun	20	10*2
6	5+1	100	kɛmɛ
		1000	uŋ-kɔntu

4.13.2 Gola

Table 4.251: Gola numerals

1	guùŋ	7	5+2
2	tì-yèe/tì-el/cel	8	5+3
3	taai/tāāl	9	5+4
4	tii-nàŋ	10	zìiyà
5	nòònòŋ	20	kpè(w)ùŋ
6	5+1	100	20*5
		1000	< English

4.13.3 Limba

Table 4.252: Limba numerals

1	ha-nthe	7	5+2
2	ka-le/kaa-ye	8	5+3
3	ka-tati	9	5+4
4	ka-naŋ	10	kɔhi
5	ka-sɔhi	20	10*2
6	5+1	100	kɛmɛ, wuli (borrowed)
		1000	wulu (< Mande)

4 Step-by-step reconstruction of numerals in the branches of Niger-Congo

This chapter includes 250 tables presenting the evidence by group, branch or sometimes a dialect of a certain language. Among them are summary tables that provide an overview of the numerical terms in twelve major families of Niger-Congo and in a number of isolated languages. Our attempt at reconstructing the Proto-Niger-Congo numeral system on the basis of this comprehensive evidence will be presented in Chapter 5.

5 Reconstruction of numerals in Niger-Congo

5.1 'One'

The five stems present in Table 5.1 are the most likely candidates for the reconstruction of 'one' in NC (Table 5.1).

Commentary. The chart is used to demonstrate the distribution of roots across language families. It groups twelve families into five major branches, including Western NC (Atlantic, Mel), Northwestern NC (Dogon, Gur, Mande), Northern NC (Ubangi, Adamawa), Southern NC (Kru, Kwa, Ijo, BC), and Eastern NC (Kordofanian).

It should be stressed that this grouping has no implication for the genealogical classification of the NC languages and merely serves as convenient means of display for the isoglosses that will hopefully help to adjust the existing classification.

The chart demonstrates a variety of possible reconstructions. However, some positive knowledge can be gleaned from it. First of all, it should be stressed that a step-by-step analysis of the forms for 'one' attested in the families and branches of NC strongly suggests that no other candidates, except for those displayed in the chart above, can be reconstructed. It should also be noted that the reconstruction of a tri- or even disyllabic root on the basis of the available evidence seems highly improbable, since all potentially reconstructible roots are monosyllabic. Moreover, the inventory of these roots is limited and merits special discussion. Such a discussion is essential, since many of the quasi-reconstructions presented above are not immediately apparent. The problems pertaining to the reconstruction of these roots were to some extent treated in the previous chapter. What follows is a brief survey of the basic facts.

The root **di*. This well-known root has received much scholarly attention as the major candidate for the reconstruction of 'one'. It is manifestly absent only

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Table 5.1: Niger-Congo stems for ‘1’

* di		Dogon		Kordofan lel/led?
Atlantic di(n)/li(n)/ne(n)	Mande	Gur de/le/re	Ubangi le/ne	Adamawa di
Mel -le?	Kru	Kwa di-	Ijo die ?	Benue-Congo (o-)di(n), ni/nye
* in		Dogon		Kordofan
Atlantic -in?	Mande	Gur	Ubangi	Adamawa in?
Mel -in	Kru	Kwa	Ijo	Benue-Congo hin/kin/cin/-in
* do		Dogon do		Kordofan
Atlantic don/ɔŋ	Mande do	Gur	Ubangi	Adamawa do?
Mel	Kru do	Kwa	Ijo	Benue-Congo
* ti		Dogon ti(i)		Kordofan te(k)/lu(k)
Atlantic	Mande	Gur	Ubangi	Adamawa
Mel	Kru	Kwa	Ijo	Benue-Congo (o-)ti
* gbo, *kpo		Dogon		Kordofan
Atlantic mbɔ	Mande	Gur (k)po	Ubangi k(p)o(k)	Adamawa *(g)bunu, (mon)
Mel bul, mɔ	Kru (g)bolo	Kwa	Ijo gbéri?/n-kèni?	Benue-Congo gbon, m-o?

in Kru, Mande and Dogon. In addition to the families listed above, this root is also attested in the Laal language isolate (*bìdíl* (*bì-díl?*) ‘1’). It is absent in the Sua, Gola and Limba isolates. It bears reminding that the reconstruction of this root in Benue-Congo and Bantu is only possible under the assumption that PB *mòdì* < **m-ò-dì* ‘1’ (with *m-* being a Proto-Bantu CL1, and *-ò-* being an archaic noun class marker (possibly < **ko-/*ʔo-*, i.e. NC class CL1 incorporated into the stem).

The root **in*. Although this root is not attested outside Western NC, BC and possibly Adamawa, it is worth mentioning, especially in view of its possible etymological relationship with **di* (see above).

The root **do*. The same is applicable to **do* (best attested in Northern NC, Atlantic and Kru).

The root **ti*. The reconstruction of **ti* ‘1’ is the least certain among the roots discussed above. The form *ha-nthe* ‘1’ attested in the Limba language isolate is noteworthy.

The root **gbo*, **kpo*. The last root is a tentative representation of the forms with the initial labio-velar (or labial in the case of Western NC) that are not necessarily etymologically related. The root *guñ* ‘1’ attested in the Gola isolate may belong here as well.

In addition to the five roots treated above, apparent innovations may be attested in particular families (or even in groups within them). Among these are Kordofanian *ʃɔn* (cf. Sua *sɔn*), Gur *túru/tumɔ*, Mande West *kelen*, and Atlantic Bak *-anor*, *əkon*.

5.2 ‘Two’

5.2.1 ‘Two’

A systematic comparison of the terms for ‘two’ attested in the NC families yields somewhat unexpected results. The only candidate for the reconstruction of the NC term is the root that can be tentatively recorded as **di*. However, nearly every family has its own root (or, more often, roots) for ‘two’ that finds no parallel outside the branch/family in question. The distribution of **di*, as well as an overview of isolated roots, is presented in the chart below (Table 5.2).

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Table 5.2: Niger-Congo stems for ‘2’

*di/ni		Dogon	Kordofan	
		lé(y)/lís(y)/né(y)/ nó(y)		
Atlantic di(k), nak	Mande	Gur nyi/ne(n)	Ubangi	Adamawa du/ru, te/re/si
Mel dín/tsin/tin/rən	Kru	Kwa	Ijo	Benue-Congo ba-di/ba-ji
isolated roots		Dogon		Kordofan kok/kek/cik, (can/ ɾan, rak, rɔm)
Atlantic ɬubəʔ, -təb/-təw, -pugut/pugus	Mande pila/fila	Gur nyu/ju, hin/han	Ubangi si/ʃi, (wa/gbwɔ, to/so)	Adamawa ra(k)/ra(p), gba/gwa
Mel	Kru so(n)	Kwa ɲɔ	Ijo mamV	Benue-Congo pa ? ba(i) ?

Commentary. The isolated forms are as follows: Laal *ʔisī* (*ʔi-sīʔ*) (this root is comparable to that attested in Ubangi), Sua *cen*, Gola *tī-yèe/ tī-el/ cel* (the Gola and Sua terms may be related), Limba *ka-le/ kaa-ye* (this root may go back to NC **di*).

The unprecedented variety of forms exhibited by the term for ‘two’ is especially surprising because this notion has been viewed as one of the most persistent in language history (it is the only numeral on the Swadesh list). As we will see below, this term is the least stable in the Niger-Congo languages. However, the NC root **di* is well-attested across the families.

5.2.2 ‘Two’ = ‘one’ PL?

As can be gleaned from the evidence presented above, the only root for ‘two’ reconstructible in NC (**-di*) is suspiciously similar to the most likely reconstruction for ‘one’ (**-di*). This similarity was first observed by Raymond Boyd, one of the most renowned experts in the reconstruction of Adamawa. Before we turn to the discussion of the most promising (in terms of the NC reconstruction) forms, an overview of Raymond Boyd’s hypothesis regarding Adamawa and some of the BC languages is in order. Here is what Boyd writes about the reconstruction of ‘one’: “A rather complicated hypothesis would, in fact, cover most of the Cross

River/Platoid data: Let us assume a single root, *DI (sometimes ~*DU) and two affixes, (V)K(V) and (V)N(V), which can appear, separately or together, as either prefixes or suffixes, or both. <...> Some support for this hypothesis is provided by the frequently observed inversion of the coronal and velar features: in most cases, where we find a term with initial velar, we find a final coronal nasal; and where we find an initial coronal, we find a final velar nasal. This can be explained by assuming the prefixation of *KV-N- in the former case, and suffixation of *-N-K(V) in the latter.” (Boyd 1989: 151–152). Boyd’s proposal is to reconstruct the Proto-Adamawa terms for ‘one’ and ‘two’ as **n-di* and **bà-dí* (with class 2 prefix) respectively (Boyd 1989: 156). According to him, “It was suggested above that the Cross River/Platoid root for ‘one’ was *DI. We may now hypothesize that the root for ‘two’ in the proto-language for these groups was the plural *BA.DI, and that, when Proto-Bantu developed its more complicated class system, this term, whose prefix may have been invariable, was reinterpreted as mono-morphemic” (Boyd 1989: 157).

It should be stressed that Boyd’s hypothesis explains the Proto-Bantu forms that underwent the following transformation over the course of time: **m* (CL1)-*o* (<*CL1)-*di* > **mò-òdì* / *mòì* ‘1’/ *ba*(CL2)-*di* > *badi* ‘2’ (the dialectal Proto-Bantu form *jòdè* (zones BH) (< **jò*(CL5 ?)-*dì*?)). It bears reminding that our evidence favors the reconstruction of (*o*)-*di*(*n*) ‘1’/ *ba-di* / *ba-ji* ‘2’ at the BC level.

One of the major problems with this reconstruction is that synchronically the roots for ‘one’ and ‘two’ are the same in only a minority of the modern NC languages. This rare phenomenon is attested in the Ngabaka branch of Ubangi (Table 5.3).

Table 5.3: The same stem in ‘1’ and ‘2’ (**di*)

	‘one’	‘two’
Bayanga	bo-dé	bi-dé
Bomasa	bo-dé	bi-dé
Baka	kpó-de	bí-de
Gundi	po-dé	bi-dé
Ngombe	kpóo-de-	bí-de-

As stated above, examples of this kind are exceptionally rare. A possible explanation for the overwhelming absence of the identical roots for ‘one’ and ‘two’ is that one of the classes is subject to the nasalization process (entailing further phonetic changes within the root), while the other is not. It bears reminding that,

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according to Boyd, a number of expanded forms such as **n-di* (with further development to **-ni / -in* ‘one’) is reconstructible along with **-di*.

In view of this, the Oti-Volta numbers, thoroughly discussed in the previous chapter, are especially interesting. The pertinent Oti-Volta forms are as follows (Table 5.4).

Table 5.4: Potential reflexes of **di* ‘1’ = **di* ‘2’ in Gur

	i. Buli-Koma	ii. Eastern	iii. Gurma	iv. Western	v. Yom-Nawdm	*Proto-Oti-Volta
1	yéŋ, ní	dènnì,yēnde/ yòn, *de	yènn(do), den, ni	yen/yin, dam	hén, nyǎŋ	den/yen, ni, de?
2	yè, li	déé(ni), yēdē	le/dé	yi(?)	li/ré?/*rɣa?	li/yi

The terms for ‘one’ and ‘two’ are similar within each of the branches, the differences between them being due to the presence of the nasal component in the term for ‘one’.

5.3 ‘Three’

As is well known, the term for ‘three’ is exceptionally persistent, with the same root attested in all of the major NC branches (except for Mande). The same root is also present in the Western NC isolates, cf. Sua *b-rar*, Gola *taai/tāāl*, Limba *ka-tati*. However, some languages exhibit what are apparently innovative forms (see the downmost segment of the chart). An isolated root is also attested in Laal (*māā* ‘3’).

Although the relationship between the reflexes of the main root (**tath*) is unquestionable, their phonetics pose a problem. The issue is that each family exhibits a great variety of reflexes, while some of them cannot be explained as going back to either the initial **t-* or the final **-t* of the main root. In other words, reliable correspondences (with **t* preserved) are traceable in the majority of families, but not in the case of ‘three’. This forces us to assume that **t* may be irregularly reflected as *s*, *r*, *h* in particular families.

The table below (Table 5.6) provides an overview of the pertinent Bantu reflexes of **tátò* (ABEFGHJKLMNPRS)/**cátò*/**cácò* (CD) ‘three’ (these reconstructions follow BLR3).

Table 5.5: Niger-Congo stems for '3'

		Dogon taan		Kordofan tat/ tət/ʔak
Atlantic North: 'taʔ	Mande	Gur tat/ta(n)	Ubangi taar	Adamawa taat
Mel sas/ra	Kru taa(n)	Kwa ta	Ijo tato	Benue-Congo tat
		Dogon		Kordofan (ʔitin/ʔicin, hwɔy)
Atlantic Bak: feegir, yanʔ/ jentʔ, habi/yabi	Mande sakpa/sagba/sawa ʔààkɔ̃/yààkáʔ	Gur	Ubangi	Adamawa kunʊŋ/gbunʊŋ
Mel	Kru	Kwa	Ijo	Benue-Congo

Table 5.6: Reflexes of *tátò '3' in Bantu

zone	Language	Form	zone	Language	Form
A	Nyo'ò	tá	*PB	*PB (dial.)	cátò
A	Lundu	aru	D	Lega	sáro
A	Bonkeng	alu	E	Pokomo	hahu
A	Fang	lal	E	Embu	thatu
A	Ewondo	lá	E	Kahe	radu
A	Kpa	ráá	F	Sukuma	datu
A	Lombi	laso	G	Pemba	tatu
A	Bubi	cha	G	Tikuu	chachu
B	Yansi	taar	J	Konzo	satu
B	Mbere	tadi	J	Luganda	ssatu
B	Sira	reru	J	Nyankole	shatu
B	Kande	lato	K	Nyengo	ato
B	Galwa	ntfaro	K	Mbwela	hatu
C	Bua	salu	L	Kete	sàcw
C	So	saso	S	Lozi	talú
C	Sakata	sâa	S	Venda	raru
C	Koyo	tsáro	S	Swazi	tsâtfu

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The Bantu forms should be discussed in order to determine which processes in Bantu (and in Niger-Congo in general) give rise to such a diversity of phonetic variants.

The root includes two consonants. Putting aside the problem of the vowel in the second syllable, we label the two consonants C- and -C respectively. Each of them may be dropped, yielding the Bantu forms **ta** and **at** (Figure 5.1).

Each of them can be transformed, for example, with a spirantisation $*t > s$, or $*t > r$, $*t > l$, can become voiced $*t > d$ and only after that can the second consonant be dropped. (Figures 5.2–5.3).

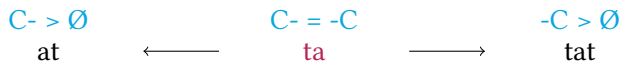


Figure 5.1

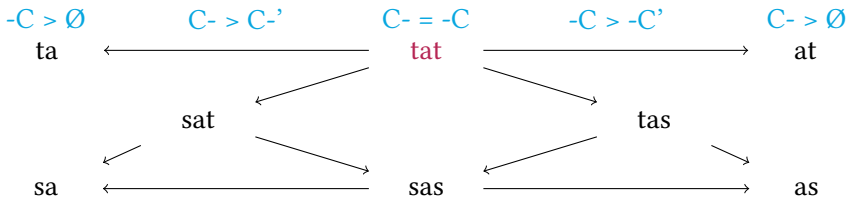


Figure 5.2

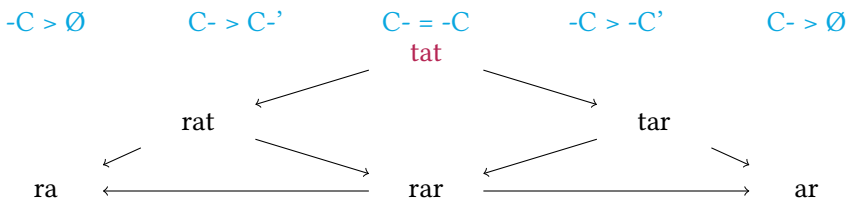


Figure 5.3

As a result, we have numerous forms, while the variation can be reduced to a very limited number of processes:

- Voicing (*t > d)
- Lenition – partial (spirantization: *t > s, *t > r) or full (> Ø).

Table 5.7 provides a structured overview of the derived Bantu forms (with no arrows).

Table 5.7: Phonetic variations of *tat-

-C	C-	C- -C	-C	C-
tat				
ta				at
	sat		tas	
sa		sas		as
	cat		tac	
ca		cac		ac
	rat		tar	
ra		rar		ar
	lat		tal	
la		lal		al
	hat		tah	
ha		hah		ah
	dat		tad	
da		dad		ad
	zat		taz	
za		zaz		az

However, the resource for changes in Bantu is not limited to the above. The derivational schemes mentioned above are constructed not only on the basis of *tat*, but also from newly derived forms. For example, **tat* > *sat*, and others (Figure 5.4).

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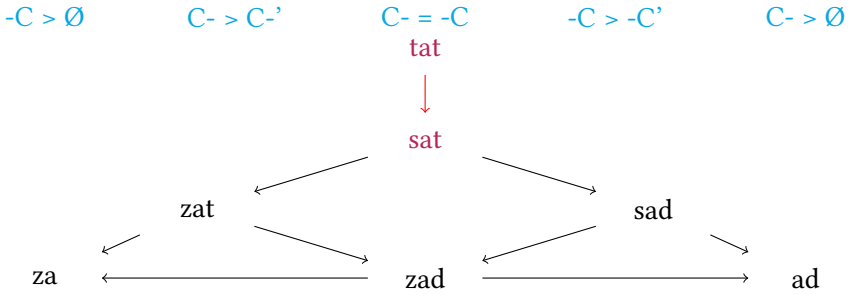


Figure 5.4

This is where the following forms (Table 5.8), many of which are attested in Bantu, originate (forms without square brackets).

Table 5.8: Reflexes of **tat-* attested in Bantu

	sat	cat	rat	lat	dat	zat
tas	sas	[cas]	[ras]	las	[das]	[zas]
tac	sac	cac	[rac]	[lac]	[dac]	zac
tar	sar	car	rar	[lar]	dar	[zar]
tal	sal	[cal]	[ral]	lal	[dal]	[zal]
tah	[sah]	[cah]	rah	[lah]	[dah]	[zah]
tad	sad	[cad]	rad	[lad]	dad	[zad]
taz	[saz]	[caz]	[raz]	[laz]	[daz]	zaz

We often do not know how one or another derived form appeared. For example, the form *las* in the first line of the table could have originated from **tas* (as a result of the change in the first consonant – the variation in the line) or from **lat* (the change of the second consonant – column). Many of the forms which are predicted theoretically are not attested in Bantu; these are shown in square brackets.

The most amazing observation here is not the high degree of variation (which itself needs to be considered), but the fact that we find precisely the same variations in different branches of NC. As a result, in different branches of NC—that is—in languages with distant genetic relations, we find numerous identical forms, while in every branch taken separately we find an “antimagnetic” landscape of forms, which in closely related languages tend to be maximally differentiated.

Examples from seven branches of NC are given below and divided into two structurally identical tables (Table 5.9–5.10).

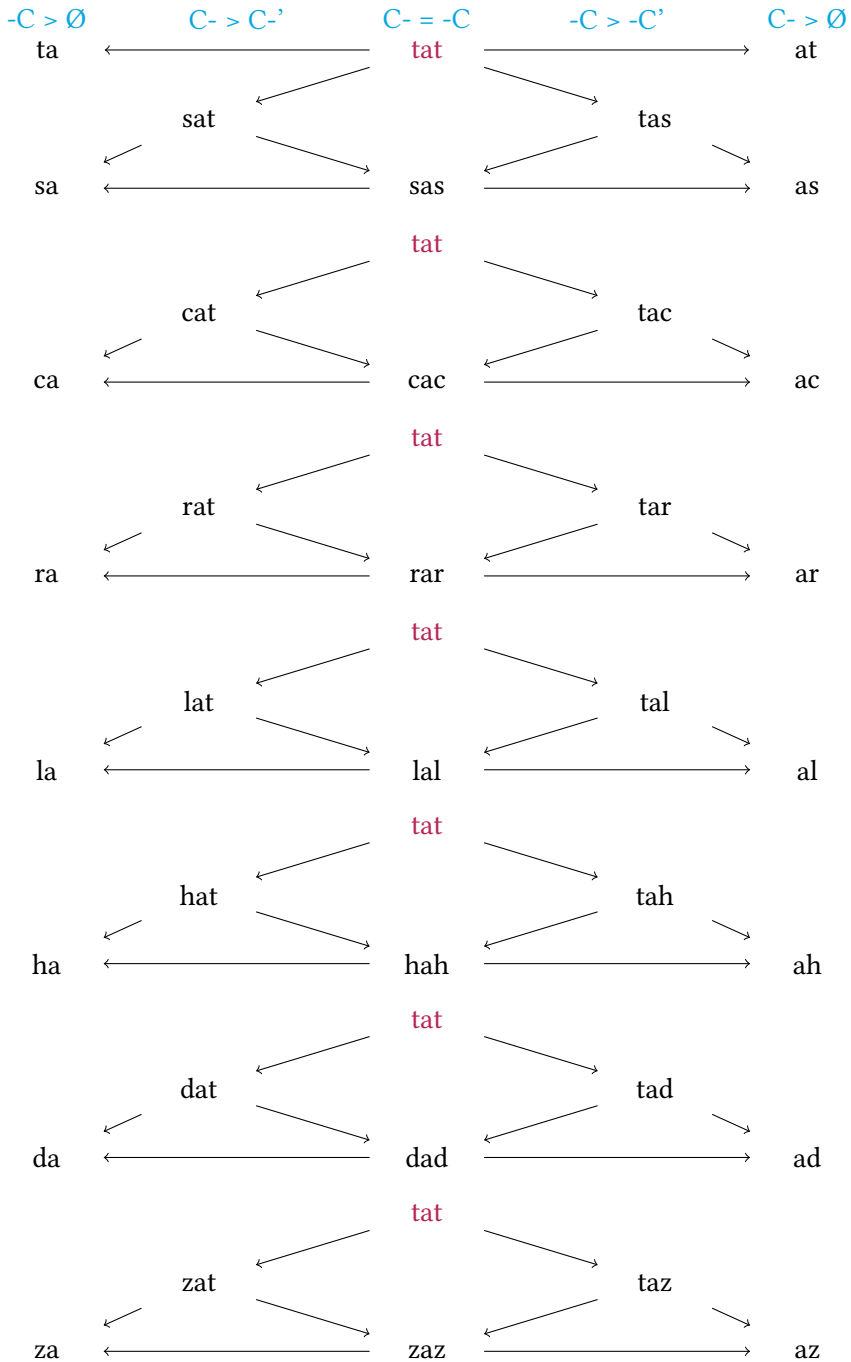


Figure 5.5

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Table 5.9: Reflexes of *tat- in Niger-Congo (1)

Bantu		Adamawa		Atlantic-Mel		
TAT	Rundi	tatu	Yendang	tat	Fula	tat-
TAR	Yansi	taar	Bangunji	taar	Buy	taar
TAL	Lozi	-talu	Dadiya	tal	Gola	tā'l
TAD	Mbere	-tadi			Sereer	tad-ak
TAS			Kulaal	tòòs	Bapen	ḃΛ-tas
TAZ			Mom Jango	tàáz	Tanda	-taaz
TA	Nyo'o	tá	Tunya	ta		
SAT	Bushong	-satu	Kumba	sa:t		
SAR	Nzadi	i-sár				
SAS	So	-saso			Temne	pè-sās
SA	Sakata	i sâa	Mangbai	bi-ssá-		
AT	Nyengo	-ato			Nalu	-at
AR	Lundu	-aru			Kasanga	-ar
LAL	Fang	lal			Nyun	ha-lal
RAR	Venda	-raru			Sua	-rar
RA	Kpa	-ráá			Sherbro	ra
CAR	Orungu	tjaro	Kam	tshar		
CA	Bubi	-cha	Galke	cha-?a-		
HAT	Nkoya	-hatu			Manjak	go-hant
DER					Baga	der
					Mboteni	

We see, for example, that roots **TAL** and **TAR** are observed in all seven branches.

To get a comprehensive idea of the presence of the forms in each branch we are attracting attention to the following chart, where the presence of the forms (at least in one language) is marked by a cross (the data is arranged in descending order in the summarising column as well as in the summary line) (Table 5.11).

The following chart represents the number of groups (within the 14 branches of Niger-Congo) presenting the respective combinations of the first (the line) and the second (the column) consonants (the data is presented in descending order) (Table 5.12).

As we can see, the most frequent consonants in the initial position are **t-** and **s-**, while the second consonant is one of the following three: **-Ø**, **-t**, or **-r**.

If we reconstruct *tat- on the NC level, in line with the majority of linguists, we will have to contend with quite a mysterious picture. In the majority of

Table 5.10: Reflexes of **tat-* in Niger-Congo (2)

Bantoid		BC		Dogon		Gur		
TAT	Bankala	tát	Biom	be-tat	kolum so	tūāti	Ditammari	-tāāti
TAR	Mambila	tar	Jiru	i-tar	bangeri-me	ke-taro	Senari	tāre
TAL	Kom	tál	Olulumo	è-tál	toro tegu	taali	Nateni	tāli, tādi
TAD	Ngwe	tád	Upper-Cross	*-ttáD	tommo so	tadu	Nateni	tādi, tāli
TAS			ikaan	tás				
TAZ								
TA	Abon	-ta	Ibibio	i-tá			Dagbani	-ta
SAT			Morwa	sat				
SAR	Mbe	bé-sár	Kugbo	i-sár			Lorhon	sā:r
SAS							Viemo	saasi
SA	Ekoi	é-sá	Oloma	e-sa			Kulango	sā
AT			Kohumono	a-átá			Hanga	ata
AR								
LAL								
RAR			Abua	i-rààr				
RA	Nkem	i-rá	Ukue	è-rhá				
CAR			Ufia	kù-tshàr				
CA			Bandawa	ni-ca				

younger proto-languages we will also have to reconstruct **tat-*, because, as it has already been shown, it descends into more or less the same variation of forms. It means that during thousands of years, from Proto-NC to the formation of proto-languages in separate branches, the form remained phonetically unchanged. Then, suddenly the root **tat* independently started to explode, giving rise to much phonetic variation in its reflexes.

I think that a hypothesis stating that the root already contained close but not identical consonants in NC is far more typologically justified. The first consonant in that case was **t-*, while the second one was represented by a specific phoneme for which no traces remain, for example, **-th*?, **-t*?, **-tʂ*?, **-c*? As we tried to show in (Pozdniakov & Segerer 2007), the phonotactics of many languages (not exclusively in Africa) demonstrates the same tendency: in CVC structures languages tend to avoid consonants constituting a minimal pair, for example, *fVp*, *bVp*, *sVz*, *lVr*, *rVl*, *sVf*, etc. In diachronic perspective, the existence of such combinations often leads to numerous irregular changes, in the course of which the consonants either become identical, for example, **lVr* > *lVl*, or, on the contrary, acquire a higher level of contrast, escaping the zone of “dangerous proximity”, for example, **sVsh* > *sVh*, **bVp* > *bVf*. In other words, similar sounds being adjacent to one another are a constant zone of tension which provokes all possible irregular changes.

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Table 5.11: Distribution of different reflexes of *tat- in the Niger-Congo families

	Bantu	Benue-Congo	Atl	Adam.	Bantoid	Gur	Mel	Kwa	Ubangi	Dogon	Kordofanian	Kru	Ijo	Mande	
TA	x	x		x	x	x		x	x		x	x		9	
TAR	x	x	x	x	x	x			x	x			x	9	
TAT	x	x	x	x	x	x	x			x				8	
TAL	x	x		x	x	x	x		x	x				8	
TAD	x	x	x		x	x				x	x			7	
SA	x	x		x	x	x		x						7	
AT	x	x	x			x		x			x			6	
RA	x	x			x		x		x					5	
SAR	x	x			x	x			x					4	
SAS	x		x			x	x							4	
LA	x	x							x			x		4	
TAS		x	x	x										3	
SAT	x	x		x										3	
AR	x		x					x						3	
HAT	x		x								x			3	
RAR	x	x	x											3	
CAT	x	x			x									3	
CAR	x	x		x										3	
TAZ			x	x										2	
HA			x					x						2	
LAL	x		x											2	
DAT	x	x												2	
CA	x			x										2	
SAL	x													1	
AL	x													1	
AS							x							1	
HAH	x													1	
THAT	x													1	
TSAR	x													1	
RAH							x							1	
DAR			x											1	
TAH		x												1	
TAC		x												1	
DAD	x													1	
DAZ						x								1	
RAT					x									1	
RAD	x													1	
LAT	x													1	
LAS	x													1	
SAD		x												1	
SAC	x													1	
CAC	x													1	
ZA								x						1	
ZAC			x											1	
	31	19	14	10	10	10	6	6	5	4	4	2	1	1	123

Table 5.12: Number of different phonetic structures for ‘3’ in 14 NC branches

	∅	t	r	l	d	s	c	h	z	
t	10	8	9	8	7	3	1	1	2	49
s	7	3	4	1	1	4	1			21
c, ts	3	3	5				1			12
∅		6	3	1		1				11
r	5	1	3		1			1		11
l	4	1		2		1				8
h	2	3						1		6
d		2	1		1				1	5
z	1						1			2
	32	27	25	12	10	9	4	3	3	125

It is very likely that such a situation characterises the NC root for ‘three’. In this case, the considerable phonetic variability of the root in all the stages of its development from Proto-NC to contemporary languages can be typologically – phonotactically – explained.

5.4 ‘Four’

Just like the term for ‘three’, the term for ‘four’ is exceptionally persistent in NC. It is represented by the same root in all the families (except for Mel and Kordofanian), as well as in the Western NC isolates, cf. Sua *b-nan*, Gola *tii-nàŋ*, Limba *ka-naŋ*. At the same time, a number of innovations are attested in some of the families (see the downmost segment of the chart) and in the Laal isolate, cf. *būsān* (*bī-sān?*) ‘4’.

This root is not present in Nilo-Saharan (including Songhai), nor in Afroasiatic or Khoisan. In light of this, the root can be viewed as one of the best isoglosses indicating the genetic relationship of languages within NC. Used together with the isogloss for ‘three’, it becomes a powerful means of classification, i.e. if the term for ‘three’ has (or goes back to) *t-* as the initial consonant in a given language, whereas the term for ‘four’ starts with *n-*, this language must belong to the Niger-Congo family. Hundreds of the NC languages match this description, while, as far as I am aware, none of the languages from other families meets these requirements.

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Table 5.13: Niger-Congo stems for ‘4’

		Dogon nay(n)		Kordofan
Atlantic Nord: nak	Mande nááni/nāāi	Gur naan	Ubangi naar	Adamawa naX, nēn/nìŋ, nda
Mel	Kru na	Kwa na	Ijo néín	Benue-Congo nai
		Dogon kéeso		Kordofan -ɾɔŋ/-ɾandɔ/-rɔm? (-gálɪm)
Atlantic Bak: baakər/ wakər, tasala	Mande	Gur	Ubangi (syɔ), lu	Adamawa
Mel Nord: ’-ŋkɪlɛ/ -nlɛ, Sud: hiɔl	Kru	Kwa	Ijo	Benue-Congo

There will probably be no objection from the specialists in the field to the statement that the main root for ‘four’ begins with *na-, e.g. this form is reconstructed for Proto-Potou-Akanic-Bantu by John Stewart. However, many languages show that the root initially included two vowels, *i being the second of the two. The major issue, however, is establishing whether the root included another consonant (i.e. whether *nai or *naCi should be preferred) and if so, what it was. Stewart suggests *na~ŋi~ ‘4’ as the Proto-Potou-Tano-Congo form (Stewart 1983), but his reconstruction is not applicable to NC.

However, the reconstruction of the proto-form for ‘four’ is not an easy task. The problem is that a given form does not define the languages it is attested in as members of the same group. Nearly every group has an inventory of phonetically similar forms (just like in case of ‘three’). The Bantu languages may provide a good illustration for this phenomenon.

The most frequently attested Bantu forms include *na*, *nai*, *nayi*, *ne*, *nei* and *ni* (six in total). They are found in 276 of 355 Bantu sources that include a form for ‘four’ available in our database. Their zonal distribution is as follows (Table 5.14).

Table 5.14: Distribution of the main n- forms for '4' in Bantu zones

zone	na	nai	nayi	ne	nei	ni	total	sources
A	13	3	2	6	1	7	32	52
B	31	8	10	7	1	1	58	65
C	2	2		2	18	1	25	28
D	1	1		4			6	14
E	4			4		1	9	19
F				9		3	12	13
G	2			18		1	21	26
H	7						7	11
J	10			15		1	26	27
K	6			7		1	14	15
L	6	1	2				9	12
M	3	1		11		5	20	20
N	2	3	2	2			9	12
P	2	2					4	11
R				3			3	7
S	7			14			21	23
total	96	21	16	102	20	21	276	355

As can be gleaned from the table, the six forms discussed above are commonly attested in our sources stemming from zones as diverse as C, F, J, M, and S. For instance, pertinent forms are attested in 26 out of 27 sources available in our database for the J zone (the last source, namely the Luganda language, has *nya* 'four' that probably goes back to the same root).

The problem, however, is that this (or a nearly identical) set of forms is attested within the other NC families as well, cf. e.g. the Kwa evidence (Table 5.15).

Table 5.15: Main n- forms for '4' in Kwa

Agni (Anyin)	n-na
Abron	n-nai
Baule	nu-ne
Eotile (Beti)	a-ni

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The Adamawa evidence is as follows (Table 5.16).

Table 5.16: Main n- forms for ‘4’ in Adamawa

Tupuri	na
Mundang	nai
Gula	nay
Waja	ni

My suggestion is that the variety of similar forms attested in the majority of the NC branches may be due to the complex inter-relationship between the terms for ‘four’ and ‘eight’ in NC. We will return to this hypothesis later, in the section dealing with ‘eight’.

5.5 ‘Five’

The term for ‘five’ is typically based on the lexical term for ‘hand’ in Mel and Atlantic. At the same time, the term for ‘ten’ is often derived from ‘five’ or, like ‘five’, directly from ‘hand’ in the plural. Multiple examples illustrating this phenomenon will be provided below. At this point I will limit myself to merely stating that the attestation of this pattern throughout the NC branches is inconsistent. Thus, it is virtually unattested in Bantu (as well as in BC on the whole). According to Nurse & Philippson 1975/1999, the Usseri dialect of Rombo (Bantu E) is a unique exception in this respect, cf. *ku-oko* ‘hand’ (Proto-Bantu **bókò*) yielding *ku-oko* (‘5’) and *ku-oko ka-vili* (‘10’, ‘5*2’). At the same time, the reflexes of the Proto-Bantu roots for ‘five’ (*tanu*) and ‘ten’ (*i-kumi*) are attested in this language along with the irregular forms discussed above. These two patterns are barely attested in Kwa, Gur, Kru, or Ijo. On the contrary, they are common not only in Atlantic and Mel but also in Ubangi (Gbaya in particular), in some of the Adamawa languages, in a number of Kordofanian branches and possibly in Mande. In view of this distribution, the existence of these patterns in NC seems unlikely. Apparently, the terms for ‘hand’ should be considered when trying to establish the NC etymology for ‘five’ and ‘ten’.

Our discussion will start with the unrelated roots for ‘hand’ and ‘five’ attested within the same branch. Then we will turn to the evidence of those groups where both terms go back to the root for ‘hand’. This approach will allow the accumulation of data that will enable us to suggest a likely diachronic explanation for the phenomenon.

We will start with the Bantu evidence. The Bantu languages (like the majority of the NC groups in general) are characterized by the presence of multiple roots for 'hand' and 'arm'. The most persistent of these according to BLR3 are the following roots (Table 5.17).

Table 5.17: Distribution of the stems for 'hand', 'arm' in Bantu zones

PB	meaning	regions (5)	zones (16)
bókò	arm; hand; front paw	5: NW SW Ce NE SE	14: A B C D E G H J K L M N R S
gànjà	palm of hand; main	5: NW SW Ce NE SE	14: A B C D F G H J K L M N P S
pí	palm of the hand; slap	5: NW SW Ce NE SE	14: A B D E F G H J K L M N R S
kónò	forearm; arm; hand; leg; hoof	4: SW Ce NE SE	10: E F G J K L M N P S
nàmà	limb: arm; leg; thigh	4: NW SW Ce NE	8: A B C E H L M R
jádà	nail (> finger > 'hand')		> 'hand' A D E F G J L N P S

I would like to stress that these roots are virtually unattested in Bantu with the meaning 'five' or 'ten'. According to BLR3, the only primary root for 'five' commonly attested in Bantu is **táànò*. In addition, the root **dòngò*, which probably goes back to **dòngò* 'line, row' (zones: ABCDEFGHJKLMNRS) deserves our attention as well.

The initial consonant in **táànò* is the same as in **tátò* 'three', which is probably a coincidence. However, this fact can still be used for establishing the genetic relationship of the NC forms for 'five'. The possibility that the languages (or language groups) are related to the reconstructed Bantu forms is stronger if the terms for 'three' and 'five' attested in them have the same initial consonant. The following Bantu evidence (Table 5.18) is illustrative of this admittedly unconventional approach (further BC evidence will be quoted later in this chapter).

This rule is irreversible, i.e. the diversity of the initial consonants is not indicative of either form not being a Proto-Bantu reflex (Table 5.19).

The fact that the same consonants are reflected differently may have several explanations, e.g. that the noun class prefixes (especially the nasal marker of class 9) may have impacted the process. A number of other phonotactic factors may also be involved (some of which are treated in detail in the section dealing with 'three').

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Table 5.18: Identical initial consonants in ‘3’ and ‘5’ in Bantu

	Language	‘3’ - *tátò	‘5’ - *táànò
Bantu-J	Rwanda	tatu	tanu
Bantu-B	Punu	reru	ranu
Bantu-E	Gusii	sato	sano
Bantu-G	Swahili	tatu	tano
Bantu-R	Herero	odatu	odano
Bantu-A	Bubi	ca	cio
Bantu-A	Tunen	lal	lan

Table 5.19: Different initial consonants in ‘3’ and ‘5’ in Bantu

	Language	‘3’ - *tátò	‘5’ - *táànò
Bantu-F	Bungu	tatu	(zi)sano
Bantu-G	Pogoro	tatu	mhanu
Bantu-S	Sesotho	taro	hlano
Bantu-G	Komoro	traru	canu
Bantu-D	Holoholo	satu	tano
Bantu-J	Haya	-satu	i-tanu
Bantu-K	Mbwela	-hatu	-tanu
Bantu-E	Kahe	si-radu	si-tanu
Bantu-A	Kpa	-ra	-tan
Bantu-G	Tikuu	-cacu	-tano
Bantu-K	Mwenyi	-atu	mu-tanu
Bantu-A	Balong	be-lal	be-tan
Bantu-B	Kele	-lali	-tani
Bantu-L	Mbwera	k-atu	-tanu
Bantu-E	Digo	-hahu	cano
Bantu-E	Taita	i-dadu	i-sanu
Bantu-N	Manda	ji-datu	mu-hanu
Bantu-S	Ronga	-rjarju	tlhanu

The pairs of BC terms with the same initial consonant attested outside Bantu will be our primary concern in further discussion. Some of them are quoted in the table below (Table 5.20). As can be gleaned from the table, the root **tanV* / **taVn*

Table 5.20: Identical initial consonants in '3' and '5' in Benue-Congo

BC	Language	'3' - *taT	'5' - *tan
Bantoid	Tiv	-tar	-tan
Bantoid	Mambila	tar	tin
Bamileke	Bamun	i-tet	i-ten
Chamba	Chamba	tera	tuna
Daka	Dirrim	tara	tona
Daka	Gandole	tara	tuna
Bamileke	Kom	tal	tain
Beboid	Dumbo	te	ten
Grassfieldss	Mmen	ta	taij
Jarawan	Jarawa	tat	towun
Nkambe	Mbe'	tei	tan
Idomoid	Gade	i-ta	i-to
Jukun	Proto-Jukunoid	*tat (i-)	*ton (i-)
Ikaan	Ikaan	tas	ton
Lower-Cross	Anaang	i-ta	i-tien
Upper-Cross	Olulumo	e-tal	e-tan
Kainji	Amo	n-tat	n-taun
Platoid	Horom	tat	ton
Ekoid	Nkem	i-ra	i-ron
Jarawan	Mboa	sai	sian
Edoid	Proto-Edoid	*i-caGi ¹	*i-ciNeni
Edoid	Ukue	e-rha	i-rhini
Edoid	Okpamheri	esa	iseni
Idomoid	Eloyi	e-la	e-lo
Jukun	Wapan	cara	cwana
Jukun	Jukun Jibu	sara	sona
Upper-Cross	Korop	bu-nan	bu-neg
Upper-Cross	Kiong	o-nan	o-nen
Platoid	Irigwe	ciæ	co
Platoid	Morwa	sat	suon

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is systematically attested in nearly every BC branch, hence its reconstruction at the Proto-BC level seems certain. Moreover, it is widely attested in many other NC branches as well. The following forms of ‘three’ and ‘five’ (with the same initial consonant) are comparable to *BC root (Table 5.21).

Table 5.21: Identical initial consonants in ‘3’ and ‘5’ in Niger-Congo

Family	Language	‘3’	‘5’
Kwa	Ewe	eto	ato
Kwa	Fon-Gbe	a-to	a-to, *ta
Kwa	Fon	a-tɔn	a-tɔ́n
Kwa	Tuwuli	ɛ-lalɛ	e-lo
Kwa	Kebu	ta	to
Kwa	Igo (Ahlon)	ita	uto
Adamawa-Bua	Gula	tar	tiŋ
Adamawa-Bua	Bolgo	teri	tiso
Adamawa-Bua	Koke	teri	tiso
Adamawa-Mbum	Mambai	bi-saa	bi-sape’e
Ijo	Defaka	tato	tuno
Mel	Bom	tat	tan

The Table 5.21 shows peculiar forms attested in one of the Southern Mel languages (Bom) that are virtually identical to the BC reconstructions. Thus, we have every reason to reconstruct the term for ‘five’ as *tan (unrelated to ‘hand’) at the NC level. The distribution of this root is illustrated in the following chart (Table 5.22).

Table 5.22: *tan ‘5’ in Niger-Congo

		Dogon		Kordofan dinin/dulin?
Atlantic tɔk, tɔn?	Mande **tan? (> ‘10’?)	Gur tɔ	Ubangi	Adamawa sa?
Mel kə-ʈamaʈ (<*kə-ʈa ‘hand’?), tan?	Kru	Kwa ton	Ijo túnɔ́	Benue-Congo tan/ton

¹Elugbe 1987.

The attestations of this root in Southern NC (namely in BC, Kwa and Ijo) are more systematic. In Western NC the root is reliably attested as well, despite the fact that the Northern Mel form *kə-tamaʔ* allows a two-fold interpretation (i.e. as a derivative of either *tam-* or **kə-ta* 'hand').

The Bom form is a direct reflex of *tan* 'five'. It bears reminding that the final velar in the Northern-Atlantic forms is regular. In the Gur languages, the pertinent form is attested in particular branches only. As attested in Western Mande, the form implies a semantic innovation, i.e. **'5' > '10'*. The relationship of the Kordofanian forms is not immediately apparent.

The distribution of the alternative reconstructible root **nu/nun* is described in the chart below (Table 5.23).

Table 5.23: **nun* '5' in Niger-Congo

		Dogon núnéé(n)/nũ:(yn)/ nûm		Kordofan
Atlantic	Mande	Gur nu(n)	Ubangi	Adamawa nu(n)
Mel	Kru mm	Kwa nu(n)	Ijo	Benue-Congo

A comparison to Kru implies the labialization of dentals in the vicinity of a back vowel. As the Dogon and Gur evidence suggests, the root is possibly derived from the term for 'hand'. In Dogon the forms of 'five' and 'hand' differ in all languages/sources. Interestingly, the term that means 'five' in one Dogon language may be used with the meaning 'hand' in another (and vice versa, see Hochstetler et al. 2004, cf. the following evidence (Table 5.24).

In light of this, the fact that, according to some sources, similar distribution of the same root is attested in a number of Gur languages is intriguing, cf. e.g. the following data (Table 5.25).

This raises the question, are we dealing with direct Dogon-Gur contact or with the reflexes of an additional NC root for 'hand'? The following roots may be considered potential correspondences: Proto-Bantu **nàmà* 'limb: arm; leg; thigh' (Regions 4: NW SW Ce NE ; Zones 6: ABEHMR) or **nòè* 'finger, toe' (Regions 5: NW SW Ce NE SE; Zones 9: ADJKLMPRS), (cf. Bantu, zones MN – Nyiha-Malila-Lambya Nurse & Philippson 1975/1999) *i-nyove*, cf. (Koelle 1963[1854]) Aku (De-foid) *ɲɔwɔ* 'hand'. The Bak (Atlantic) root *ñen* 'hand', 'five' discussed above may

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Table 5.24: 'Hand' and '5' in Dogon

Group	Language	'hand'	'5'
Central	Tommo So	numə	nʔno
Central	Donno So	numə	noʔ
Northern	Dogulu Dom	numə	no
South-East	Jamsay	numə	nui
Central	Toro So	nonnən	numonron
Central	Kolum So	nuwən	numu

Table 5.25: 'Hand' and potential reflexes of *nun* '5' in Gur

Group	Source	Language	'hand'	5
Bariba	Koelle 1963[1854]	Baatonum	nóma	nówu
Bwamu	Bloemarts & de Rasilly 2012	Bwamu	núumánnu	
Grusi	Koelle 1963[1854]	Tem		nónūa
Grusi	CLNK 1999	Kabiye		naanɔwa
Grusi	Koelle 1963[1854]	Kiamba	noon/noozi	noonuua
Grusi	Koelle 1963[1854]	Sisaala Tumulung		ńnōm
Oti-Volta	Koelle 1963[1854]	Mosi	nuro	nu
Oti-Volta	Koelle 1963[1854]	Gurma	unu/inui	mu ~ mmu

belong here as well. The Gola root *nɔ̀nɔ̀nɔ̀* should also be mentioned here. The meaning 'hand' is not attested for this root in Kwa and Adamawa.

The following Atlantic roots attest to the semantic development of 'five' (and consequently 'ten') < 'hand' (Table 5.26).

This data is especially interesting in view of the BC evidence discussed above. As we have seen, the phenomenon of 'five' and 'ten' being based on the term for 'hand' is attested in both Atlantic groups (Bak and Northern). Moreover, this pattern is observable in a wide variety of roots with the meaning 'hand' attested in the languages under study (e.g. five roots with this meaning are attested in eight languages represented in the table above; the derivation pattern is the same in each case). In view of this, it is not surprising that the reconstructed NC root is not traceable in Atlantic.

Table 5.26: 'Hand' > '5' in Atlantic

Group	Language	'hand'	'5'	'10'
Atlantic-Bak	Balant	f-cef/k-	cef	f-cef meen
	Kentohe			('whole hands')
Atlantic-Bak	Bijogo	kɔ-ɔkɔ/ɲa-	nde-ɔkɔ	n-rua-kɔ
	Kagbaaga	akɔ		
Atlantic-Bak	Bijogo	kɔ-kɔ/ɲa-kɔ	ɲu-duβ-kɔ	ɲɔ-rúɲa-kɔ
	Kamona			
Atlantic-Bak	Mankanya	ka-nyɛn	ka-nyɛɛn	e-nyɛn
Atlantic-Bak	Manjak	ka-ñɛn	ka-ñɛn	ka ñɛn
Atlantic-Bak	Pepel	ɲɛnɛ	ɲɛnɛ	dise-ɲɛnɛ
Atlantic-North	Nyun	si-lax	ci-lax	haa-lax
	Djibonker			
Atlantic-North	Nyun	ci-lax/xa-	ci-lax	xa-lax
	Gujaxer			
Atlantic-North	Biafada	gə-bəda/ma- bb-	gə-bəda	
Atlantic-North	Jaad	ko-bəda	ko-bəda	

The same pattern is also attested in the Northern Mel languages (that are in contact with Bak) for 'five' (but not for 'ten'), cf. (Table 5.27).

Table 5.27: 'Hand' > '5' in Northern Mel

Group	Source	Language	'hand'	'5'
Temne-Baga-Landuma	Wilson 2007	Baga Koba	kə-tsa/ɛ-	kə-tsa-mat
Temne-Baga-Landuma	Ganong 1998	Baga Sitemu	kɛ-ca	kə-ca-mət
Temne-Baga-Landuma	Wilson 2007	Landuma	kə-ca/cə-	kə-caa-mət
Temne-Baga-Landuma	Wilson 2007	Temne	kə-ta/mə-	ta-math

However, we may be dealing with the secondary alignment of the terms for 'hand' and 'five'. The pattern CV-stem-VC (with CV- and -VC being a noun class prefix and suffix respectively) is characteristic of this language group, e.g. the Temne form may go back to *ta-m-ath* with the lexical root **-mV-* as its base. This pattern could also explain the similarity between the Temne terms for 'five' and

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‘ten’: in this language *tɔfɔt* ‘10’ probably goes back to *tɔ-f-ɔt* and hence to the NC root **fu* ‘10’.

Some of the Atlantic languages (e.g. various Joola and probably Proto-Joola as well) developed a separate root for ‘five’, while the term for ‘ten’ still remained a derivative of ‘hand’. As expected, this root corresponds to Southern NC **tan/ ton* ‘5’ discussed above (Proto-Atlantic: **tok* ‘five’: Kasanga-Kobiana *ju-roog*, Sereer *be-tak / be-tuk / be-tik* (cf. also Limba *bi-sohi* ; Sua *sungun*), cf. Table 5.28.

Table 5.28: ‘Hand’ > ‘10’ in Joola (Atlantic: Bak)

Language	‘hand’	‘5’	‘10’
Joola_Banjali	ga-ɲen/gu-ɲen	fu-tox	gu-ɲen
Joola_Fogny	ka-ɲen/u-ɲen	fu-tɔk	u-ɲen
Joola_Gusilay	ga-ɲen/u-ɲen	fu-tɔk	u-ɲen
Joola_Kasa	ka-ɲen	hu-tɔk	ku-ɲen
Joola_Kasa_Esuulaalu	ka-ɲen	hu-tɔk	ku-ɲen
Keeraak	ka-ɲen-ak/ɔ-ɲen-aw	hɔ-tɔk	kɔ-ɲen
Joola_Kwaatay	ɛ-ɲɔmu	hu-tɔk	si-ɲɔmu
Joola_Kwaatay	ɛ-mɔŋo	hu-tɔk	su-muŋo
Joola_Mlomp	ɛ-be:s	ɲa:suwaŋ	sɛ-be:s

The etymological link between the terms for ‘five’ and ‘ten’ and their source (‘hand’) is not always explicit, e.g. different roots for ‘hand’ are attested in some of the sources for Mankanya-Manjak (Atlantic) and Temne (Mel), along with the derived form for ‘five’. Such innovations are quoted in bold in the table below (Table 5.29).

Some of the forms of the term for ‘five’ go back to the root **ko* in a number of the Ubangi languages (and possibly in some of the Mande languages as well, see Chapter 4 for details). Here we may be dealing with a NC root, cf. e.g. ‘hand’: Proto-Gbaya *kɔ̃*, Proto-South Mande *kɔ̃*, Proto-Eastern Mande *gɔn* (?), Dida (Kru) *kɔ̃*, etc.

The following Kordofanian terms that attest to the development of ‘hand’ > ‘5’ are also noteworthy: Dagik (Kordofanian) *si-s-ɜ:lɔ* ‘5’ (lit: ‘one hand’): “The *si* in 5 comes from the word ‘hand’. So 5 is ‘one hand’”,² Acheron *zəguŋ zulluk* (lit: ‘one hand’): “The number ‘five’ is literally ‘one hand’: *zəguŋ* = ‘hand’, *z-ulluk* = ‘one’”.³

²John Vanderelst, <https://mpi-lingweb.shh.mpg.de/numeral/Dagik.htm>

³Russell Norton, <https://mpi-lingweb.shh.mpg.de/numeral/Acheron.htm>

Table 5.29: ‘hand’ > ‘5’/‘10’ in some Atlantic and Mel languages

Branch	Language	‘hand’	‘5’
Atl.-Centre-Manjak	Mankanya	ka-nyen	ka-nyεen
Atl.-Centre-Manjak	Manjak	ka-ñen	ka-ñen
Atl.-Centre-Manjak	Manjak	kádšāg	kányan
Atl.-Centre-Manjak	Mankanya	úlōl	kányēn
Atl.-Centre-Manjak	Manjak Bassarel	pëndānd	kañan
Atl.-Centre-Manjak	Manjak Tame	wúepalōl, pl. n·gípalōl	kényān
Temne-Baga-Landuma	Temne	kə-ta/mə-	ta-maṭ
Temne-Baga-Landuma	Temne	a-loñk (i), ma-	ṭamaṭ
Temne-Baga-Landuma	Temne	à.loñk	-tàmath

To summarize, the primary root for ‘five’ (**tan*) probably existed in Proto-NC. Over time it was independently replaced with the derivatives of ‘hand’ in some branches and various languages. In turn, the original term for ‘hand’ was replaced with innovations (with the term for ‘five’ in particular) in a number of languages, cf. Atlantic *rib/ ?i:p*, Mel *wan/wen*, Mande *dúuru/ sóru*, Kru *gbə / gbo*, Gur *mwan/ bwa*, Ubangi *du(w)/ lu(w)*, Kordofanian *ɲer-/ ɲer-*. As a rule, these innovations (not quoted here exhaustively) are only attested in particular branches of the families under study.

5.6 ‘Six’

The explicit pattern ‘6=5+1’ is present in the vast majority of the families. Primary terms for ‘six’ are attested in some of the NC families (or, more precisely, in their particular branches). However, they cannot be reconstructed at the NC level (see Chapter 4 for their detailed treatment). Selected forms of this kind include Atlantic *paag/paaj* (‘7=6+1’), Kwa *golo / kolo, kua, cie* (‘7=6+1’), Adamawa *jup, gu*, Ubangi *zala/ zya*, Dogon *kuro/ kule*, Gur *do(b)*, Mande *t(s)um?* (the examples are quoted by family without further detail). The pattern ‘6=3 redupl.’ is rarely attested. It is found in BC (possibly as a Proto-BC innovation attested in Bantoid, Cross, Edoid, Kainji?, and Platoid) and Kordofanian only.

5.7 ‘Seven’

The main pattern is ‘7=5+2’ (or ‘7=X+2’ if the term for ‘five’ is replaced with an innovation). Primary roots are rare, being attested in BC (Defoid **byē* (cf. Edoid *ghie?*), Idomoid *renyi* (cf., however, Ikaan *h-ránèfi* (‘6+1’)), Adamawa (*bir/ bil, rɪŋ, nbutu*), Ubangi (*sílànā, lè-rèzi*), Dogon (*suli/ soli/ soye*), Gur (*pɛ(n)*) and Atlantic Bak (*jand/ jaan?/ cand* (Pepel)).

The rare patterns of ‘7=6+1’ and ‘7=4+3’ are limited to Atlantic Bak, Kwa, BC Platoid, and Kordofanian.

5.8 ‘Eight’ (‘four’ and ‘eight’)

In the majority of the NC families the term for ‘eight’ is historically based on the term for ‘four’ (with the exception of Mel, Kru, Dogon, Mande and Western NC isolates).

The pattern ‘8=4+4’ is normally implemented via the reduplication of the root for ‘4’. In some cases an ‘entire’ reduplication (affecting the conjunction and the noun class marker) is employed (Table 5.30).

The reduplication can also be ‘partial’ (as a rule the reduction of the first syllable is involved), cf. Table 5.31.

This pattern can also be used when the original root for ‘four’ is replaced by another one, cf. the Balant (Bak) evidence: *tahla* ‘4’ ~ *ta-ta(h)la* ‘8’. The same is observable in Yungur (and possibly in Burak (Adamawa)), cf. *net* ‘4’ ~ *nat-at* ‘8’ (Boyd 1989).

Sometimes ‘eight’ is derived from ‘four’ not via the reduplication, but by means of a simple replacement of CL.SG with CL.PL (or by adding the Pl. marker), cf. Table 5.32.

In Dii (Adamawa-Duru) a step-by-step replacement of classes is used as a derivation mechanism, i.e. ‘2’ > ‘4’ > ‘8’: *i-dú* ‘2’ > *nda-ddú* ‘4’ > *ka-ʔa-nda-ddú* ‘8’.

A rare pattern is ‘8=4*2’, with the direct involvement of the term for ‘two’, cf. Viemo (Gur) *jumī* ‘4’, *niinī* ‘2’, *jumī-jɔ niinī* ‘8’.

When considering the reconstruction of ‘four’, it should be noted that if the term for ‘four’ (on which a reduplicated term for ‘eight’ is based) has any vowel other than [a] (typically [e] or [i]), the reduplicated form either preserves the vowel present in ‘four’ or has [a] in the first syllable. This mechanism is confirmed at least in the case of Bantu (Table 5.33).

Table 5.30: '8' < '4+4' (entire reduplication)

Branch	Languages	'4'	'8'
Bantoid-Ekoid	Ekoi	ni	e-ni-ga-ni
Bantoid-Ekoid	Kwa	ni	a-ni-ka-ni
Bantoid-Ekoid	Ndoe	ne	be-ne be-ne
Bantoid-Ekoid	Nkem	ni	a-ni-gi-ni
Bantu-Central-E	Chaga	na	nana
Bantu-Central-E	Embu	nya	i-nyanya
Bantu-Central-E	Kamba	nya	nya-nya
Bantu-Central-E	Kikuyu	nya	i-nyanya
Bantu-Central-G	Sango	na	m-nana
BC-Edoid	Okpamheri	ni	e-ni-e-ni
BC-Edoid	Urhobo	ne	e-nene
Bantoid-Grass	viya	na	ge-nana
Bantoid-Jarawan	Mbula-Bwazza	i-ne	i-ne i-ne
Bantu-Central-D	Enya	na	ce-nana
Bantu-NW-B	kande	na	ge-nana
Bantu-NW-B	Lumbu	na	di-nana
Bantu-NW-B	Punu	na	i-nana
Bantu-NW-B	Sira	na	gi-nana
Bantu-Central-J	haya	na	omu-nana
Bantu-Central-J	Nyankole	na	om-nana
Bantu-Central-J	Nyoro	na	om-nana
Bantu-Central-J	Gwere	na	mu-nana
Bantu-Central-J	Nkore-Kiga	na	mu-nana
Bantu-Central-J	Soga	na	mu-nana
BC-Cross	Alege	ne	e-nene
BC-Cross	Bokyi	ɲe	ɲe-ri-ɲe
BC-Cross	Kukele	na	i-na-mi-na
BC-Bantoid	Esimbi	mō-ɲī	mō-ɲì-ō-ɲī
BC-Jukunoid	Mbembe	nyɛ	é-nyɛnyɛ
Bc-Ikaan	Ikaan	nā́/nā	nà.ná'/nà.ná
Adamawa-Fali	Fali	ná:n	nàn nán
Adamawa-Duru	Gəunəm	náárək	náárək àp náárək
Gur-Southern	Lamba	nasa	nasi-nasa
Gur-Southern	Lyele	na	nana
Laal	Laal	ḃīsān	ḃīsān.ḃīsān

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Table 5.31: '8' < '4+4' (partial reduplication)

Branch	Language	'4'	'8'
Bantoid-Jarawan	Kulung	i-nin	i-ni-nin
Bantu-NW-B	Enenga	nai	e-na-nai
Bantu-NW-B	Myene	nayi	e-na-nayi
Bantu-NW-B	Orungu	nayi/i-nayi	e-na-nayi/na-nayi
BC-Eastern-Platoid	Boyawa	nas	na-nas
BC-Eastern-Platoid	Kwanka	nas	na-nas
BC-Eastern-Platoid	Idong	enar	na-nar
BC-Eastern-Platoid	Kadara	er-nar	ir-na-nar
Ijo	Nembe	i-nei	ni-nei
Atl-Centre	Balant	tahla-	ta-tahla-
Adamawa	Yungur	kurun	kun-kurun

Table 5.32: '8' = 4PL

Branch	Language	'4'	'8'
Kwa-Nyo	Lelemi	í-né	máá-né
Kordofanian Heiban	Warnang	ɲèlàmlàn	ɲelamlaaŋ-ɔ
BC Platoid	Ikulu	ín-nāā	nín-nāā
Adamawa Leko-Nimbari	Yendang	nâ:t	ḃḵ-lá-nâ:t
Adamawa Mbum-Day	Niellim	ɲēní	twā:-ɲēní
Adamawa Waja-Jen	Waja	nu	wu-nii
Ubangi Sere-Ngbaka-Mba	Gbanzili	ḃḵ-nā	sá-nā
Gur Grusi	Delo	a-naara	gya-naara
Gur Grusi	Tampulma	a-naasi	ɲmɛ-naasa

5.8 'Eight' ('four' and 'eight')

Table 5.33: ne/ni '4' ~ nane/ nani '8' (Bantu)

Zone	Language	'4'	'8'
Proto	PB	ne	nane
NW-B	Vove (Pove)	nai	nanai
NW-B	Sira	ne	gi-nane
NW-B	Punu	ne	yi-nane
NW-B	Lumbu	ne	nane
NW-C	Kela	nei	i-nane
NW-C	Kusu	nem	e-nanem
NW-C	Ombo	nei	i-nanei
Central-E	Pokomo	ne	nane
Central-E	Zanaki	i-nye	i-nyanye
Central-F	Bende	i-ne	mu-nane
Central-F	Kimbu	ji-ne	mu-nane
Central-F	Mbugwe (Irangi)	ne	i-nane
Central-F	Nyamwezi	ne	m-nane
Central-F	Sukuma	ne	nane
Central-F	Sumbwa	i-ne	m-nane
Central-G	Bondei	ne	nane
Central-G	CAsu (dial.)	ne	nane
Central-G	Kami	ne	nane
Central-G	Komoro	ne	nane
Central-G	Kutu	ne	nane
Central-G	Ngulu	ka-ne	m-nane
Central-G	Pangwa	i-ne	nane
Central-G	Shambala	ne	m-nane
Central-G	Swahili	ne	nane
Central-G	Tikuu	ne	nane
Central-G? E?	Tubeta (Taveta)	i-ne	nane
Central-G	Zigula	ne	m-nane
Central-J	Hunde	i-ne	mu-nane
Central-J	Konzo	ne	omu-nane
Central-J	Luhya	ne	mu-nane
Central-J	Masaba	ci-ne	si-nane
Central-J	Nande	ne	omu-nane
Central-J	Vinza	ka-ne	mu-nane
Central-M	Mambwe	vi-ni	ci-nani
Central-M	Pimbwe	i-ne	nane
Central-M	Rungu	vi-ni	ci-nani

5 Reconstruction of numerals in Niger-Congo

The latter fact leads to at least two conclusions: 1) the reduplication mechanism was used to derive ‘eight’ from ‘four’ at the Proto-Bantu level; 2) [a] that which is preserved in ‘eight’ should be reconstructed in the first syllable of ‘four’, where it was lost.

Moreover, there is a considerable body of Bantu examples of a Proto-Bantu root being preserved in the reduplicated term for ‘eight’, but lost in the term for ‘four’ (Table 5.34).

Table 5.34: ‘8’ < ‘4’ ~ ‘4’ is lost (Bantu)

Zone	Language	‘4’	‘8’
Central-G	Mbugu	hahi	nane
Central-G	Bena	tayi	fi-mu-nana
Central-G	Hehe	tayi	i-mu-nana
Central-G	Ndamba	mceci	nani
Central-G	Pogoro	msemi	nani
Central-H	Kikongo	kuya	e-nana
Central-H	Yaka	ya	nana
Central-H	Yombe	ya	di-nana
Central-N	Manda	cece	nani
Central-N	Matengo	sesi	nani
Central-N	Mpoto	sesi	nani
Central-P	Matuumbi	sese	nani
Central-P	Ngindo	cece	nani

One of the factors that could explain the emergence of the second nasal in the term for ‘four’ is the alignment of ‘four’ and ‘eight’ by analogy, followed either by the replacement of the term for ‘eight’ with a composite term (‘5+3’ or ‘10-2’, see Table 5.35) or with an innovation (Table 5.36).

The evidence presented above strongly suggests that the pattern ‘8=4 redupl.’ was already in use at the Proto-NC level.

It should be noted that in those languages where this reduplication mechanism (or the pattern ‘8=4PL’) is observable most clearly, another pattern is often used along with ‘8=4+4’, namely ‘6=3+3’ (or ‘6=3PL’) (Table 5.37).

As expected, numerous languages that belong to different families exhibit a variety of patterns that are reused along with the one discussed above (including the general pattern ‘8=5+3’ as well as ‘8=10-2’ and even ‘8=6+2’). It seems, however, that such a wide distribution of this pattern (‘8=4 redupl.’) within the NC languages is genetic rather than typological.

5.8 'Eight' ('four' and 'eight')

Table 5.35: '8=4+4' > '8=5+3'

Group	Language	'4'	'8' ('5+3')
Atlantic	Baga Fore	si-neŋ/ci-neŋ	sak-tet
Atlantic	Baga Mboteni	i-neŋ	ib-ader
Atlantic	Wolof	ɲenet	jurom-ɲeta
Gur	Birifor (dial.)	anan	anu-ni-ata
Gur	Teen	nan	to sanr
Mande	Vai	nani	sog sakpa
Adamawa	Karang	niŋ	tòŋ ndók sé'de ('10-2')

Table 5.36: '8=4+4' > '8' innovated

Family	Languages	'4'	'8'
Bantu-A	Bafo	benin	wam
Bantu-A	Bankon	bi-nan	mwam
Bantu-A	Fang	ɲiŋ	mwom
Bantu-A	Ndambomo	li-naŋi	li-mwabi
Bantu-B	Kota	naŋi	mwabi
Bc-Platoid	Mabo	nen	hur
Dogon	Tene Kan	nani	silá
Dogon	Tene Kan	nani	sira
Kwa	Abron	nain	ɲocie
Kwa	Akan (Akuapem Twi)	anan	awotcye /tw/
Kwa	Baule (Baoulé)	nan	nmocue
Kwa	Foodo	naŋ	dukwe/dukoi
Kwa	Mbato	ne-ni	o-gbi
Mande	Mandinka	náani	segi
Mande	Looma	náanĩ	dosawa

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Table 5.37: '8' < '4', '6' < '3'

Branch	Language	'3'	'6'	'4'	'8'
Bantoid-Ekoid	Ekoi	e-sa	e-sa-g-asa	e-ni	e-ni-ga-ni
Bantoid-Ekoid	Kwa	e-sa	a-sa-ka-su	i-ni	a-ni-ka-ni
Bantoid-Ekoid	Ndoe	be-ra	be-ra-ba-ra	be-ne	be-ne be-ne
Bantoid-Ekoid	Nkem	i-ra	i-ra-ra	i-ni	a-ni-gi-ni
Bantu-E	Embu	i-tatu	i-ta-tatu	i-nya	i-nya-nya
Bantu-E	Kamba	i-tatu	ta-tatu	i-nya	nya-nya
Bantu-E	Kikuyu	i-tatu	i-ta-tatu	i-nya	i-nya-nya
Bantu-F	Nyamwezi	datu	ta-dato	ne	m-na-ne
Bantu-F	Sukuma	datu	ta-datu	ne	na-ne
Bantu-G	Gogo	datu	m-ta-datu	ni	mu-na-ne
Bantu-G?E?	Tubeta (Taveta)	tatu	ta-datu	i-ne	na-ne
Bantu-G	Zigula	ka-tatu	ta-datu	ne	m-na-ne
BC-Edo	Okpamheri	e-sa	e-sa-sa	e-ni	e-ni-e-ni
BC-Cross-River	Bokyi	bé-ciaat	ɲá-ciaat	bé-ɲii	ɲí-rii-ɲi
BC-Cross-River	Alege	é-ce	é-ce-e-ce	é-ne	ee-né-ne

Primary roots for 'eight' are also attested. However, their attestations are usually limited to one or two families or to particular branches within a family, cf. e.g. '8' in Defoid (BC) **jo/ ro* (cf. in Kainji *ro/ ru*), Kwa *kwe/ kye*, Kordofanian *bɔ, tɔŋi-*, Mande *seki/ segi*, Dogon *sele/ sagi* (< Mande ?), *gá(a)rà*, Atlantic Bak **ɔAS-*. These forms (as well as some additional ones) are interpreted as local innovations.

5.9 'Nine'

The main pattern for 'nine' ('9=5+4') is self-explanatory. This is the only pattern that can be reconstructed for Proto-Niger-Congo.

The alternative pattern '9=10-1' is much less common, whereas the pattern '9=6+3' (attested in Atlantic Bak) is exceptionally rare. The Platoid pattern '9=12-3' seems to be unique, cf. Birom, '15=12+3', '9=minus 3', '10=minus 2'. Primary roots are attested in those languages (branches) that have a full set of primary terms covering the sequence from 'one' to 'ten' (which is a rare case), e.g. Bantoid *bukV* (if indeed primary), Akpes *ɔ-kpɔlɔf(i)*, Defoid **sá(n), dà* (cf. Edoid *cién/*

sin), Igboid *totu/tolu*, Ubangi *kùsì*, *me-newá*, Laal *yànjáŋ*, Dogon *túwó*, Mande *kònonto/kònɔndɔ(n)* (historically perhaps ‘10–1’).

5.10 ‘Ten’

The root **pu/ fu* is the most likely candidate for the NC reconstruction. The distribution of its reflexes is shown in the chart below (Table 5.38).

Table 5.38: **pu/fu* ‘10’ in Niger-Congo

		Dogon		Kordofan
Atlantic pok	Mande pu/fu	Gur fu/po	Ubangi bú/fu?	Adamawa boo/fu?
Mel pu/tɔ-f-ɔt?	Kru pu	Kwa fo/wo	Ijo	Benue-Congo pu/fu

The roots listed in this chart are obviously related. The root is lacking in Kordofanian, where a variety of terms for ten are attested, e.g. *tu(l)*, *rakpac*, *fəŋən*, *tiərum*, 5PL. This probably indicates that in Proto-Kordofanian the root for ‘ten’ was not present. The Dogon form **pérú/ pélú* has the same initial consonant, but our evidence is inconclusive as to whether it is related to the roots above. Finally, the Ijo form (w)ójí allows a twofold interpretation. If it is taken as (w)ó-*jí* based on **ji*, it is comparable to *zìyà* ‘10’ attested in the Gola isolate. Alternatively, it can be analysed as a complex root **(w)o* ‘10’ plus *ji* (< **1*). If so, it may be related to the roots quoted above (or at least to one of its allomorphs (?) attested in Kwa).

The presence of forms with the voiced **b-** in Adamawa-Ubangi requires an explanation. The evidence suggesting a connection between the **b-** and **f-** forms attested in these languages is insufficient. In view of this, it can only be noted that a similar phenomenon is observable within the Mande family: the form **bù* is reconstructed in the Southern group of the South-Eastern Mande branch, whereas in Western Mande (as well as in the Eastern group of South-Eastern Mande) the reconstructed form is **pu/fu*.

It should be noted that the Adamawa root with the initial voiceless labial is only marginally attested (e.g. in Munga (*fuə*) and Pere (*fób*)).

Raymond Boyd tentatively suggests that *fob* is to related to the main Adamawa root **kop*: «The Kutin group has *fóp* which may be related to **kóp*» (Boyd 1989:

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162). However, an alternative explanation exists. A brief study of the Adamawa number systems shows that numerical terms attested within this family (unlike those found in other NC families) often end in **-p** or **-b**. The Tula system, one of the first quoted by Boyd in his excellent article, may serve as an example (Table 5.39).

Table 5.39: Labial suffix in Tula numerals

1	-iṅ	6	nukuṅ
2	rɔp	7	nibiṅ
3	táa	8	náá-rɔp
4	naa	9	túrukup
5	nu	10	kwɔp

The final **-p** in ‘eight’ is easily explainable (possibly due to ‘8=4*2’). However, at least in the case of ‘two’ and ‘ten’, the final **-p** is attested in non-compound terms. In his discussion of the final **-p** in the Adamawa terms, Boyd suggested that we may be dealing with the suffix ***(a)p** (or ***(a)b**, with the devoicing characteristic of a reduced consonant inventory in the final position). < ... > The same suffix also appears in group 1 in **naar-ap* ‘eight’, derived from **naar* ‘four’. < ... > Compare this situation with ‘Bantoid’ Vute: **būrúp* ‘two’, **nà:sùp* ‘four’ (Boyd 1989: 156). Furthermore, he challenges Kay Williamson’s opinion on whether this morpheme was an original suffix or a suffix that developed out of a noun class prefix. The most important result of this discussion is that the suffix ***-p/-b** found in numerical terms allows us to trace the Adamawa forms directly to NC **pu/po* without the intermediate **kop/kob*. As for the isolated Adamawa forms of *bo* ‘ten’, Boyd suggests a Chadic origin for them, although alternatively they may be related to the similar Ubangi root and reflect the NC root **pu / fu*.

The main Adamawa root **kop/kob* ‘10’ should be discussed in a wider NC context as well. In view of the secondary nature of the final **-p/-b** in Adamawa (see above), this root is comparable to the NC roots *ko* ‘ten ; hand’.

Direct BC parallels for this root (with the final labial) should be discussed first. We refer here to the hypothetical relationship of a number of forms discussed in Chapter 4, including Delta-Lower-Cross *-kɔp/du-op/du-ob* (Dimmendaal 1978 **lùgòp*) (cf. Bendi *kpu* ‘10’, nearby *fo/ hwo*), Yukuben-Kuteb (Jukunoid) *kuwub*, Kainji **kop / ʔup / kpa* (together with **pwa/ pa*), and Platoid **kop*. This evidence suggests that more attention should be paid to the reconstruction of the allomorph **kop* in both Proto-BC and Proto-Adamawa. This root should probably be

compared to the Kru root *kʷɔba* '10', unless it is a non-compound root that goes back to *ko* (see below).

In view of Boyd and Williamson's interpretation of the final labial as a suffix, the forms quoted above should probably be treated together with the root *ko* '10', which is sporadically attested in multiple families. As noted above, it most probably goes back to the lexical root **ko* 'hand', that represents one of the alternative Proto-NC reconstructions of this term. Its distribution with this meaning is as follows:

First of all, it is reconstructed by Moniño for Proto-Gbaya as *kɔ́* 'hand'. This root is also attested in Mande (at least in the Southern group of the South-Eastern Mande branch, cf. Vydrin's evidence: Proto-South-Eastern Mande **kɔ́* 'hand, arm'). In Kru, this root is attested not only in the Eastern group (Dida *kɔ́* 'hand'), but in the Western group as well (Glio-Oubi *hō*, Krumen *hō*). Finally, it is (admittedly only marginally) attested in Bantoid (as an alternative to the wide-spread root *kómì* '10'): according to Larry Hyman (in Paulin 1995) this root is distinguishable in Kom (*ā-kê*) and Narrow Bantu, e.g. in zones B (Mpur *kɔ́*, Yansi *kɔ́*) and E (Mashami *oko*, Meru *uko*, Nurse & Philippson 1975/1999). The Limba root *koh-* '10' probably belongs here as well.

It is difficult to say whether this evidence is sufficient for the Proto-NC reconstruction. However, when choosing between the two possibilities for the reconstruction of the term for 'ten' (i.e. from **pu/ fu* and **ko*) the first one should be preferred.

Among other roots relevant to our discussion, the following two roots (whose attestations are not limited to one family) are of interest: Gur *gba/kpa* '10' (cf. the BC root *gwo/jwo*) and Kwa *du* '10' (possibly related to the Adamawa root *d(u)o*; cf. also Kordofanian *ru* and Gur *nu/ nyu?*). The latter root may be compared to Bantu **dòngò* '10'. It is attested in seven zones (i.e. EGJMPR according to BLR3, but a number of attestations from D.62 are available, hence it is found in all five regions). BLR tentatively suggests a Bantu etymology for this root ('*spécialisation de "ligne" dòng?*'). However, it has parallels in other BC branches, namely in Cross River (Connell 1991) and probably Idomoid (Table 5.40).

The use of numerous other roots for 'ten' is limited to one family, i.e. they are apparent innovations, such as in Bantoid *kum/kam* '10' (Bantu *kómì/ kámá*). The latter form (that sometimes coincides with the term for 'hundred') has an internal Bantu etymology: its tentative relationship to the lexical root meaning 'touch' is assumed in BLR 3 (BLR3: 'see also *kóm* 'touch' - zones DHJLM'). However, the nasalization of the final segment in the Bantoid proto-form cannot be excluded. If this process indeed took place, this form becomes comparable to **ku(b)* as well as others discussed above.

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Table 5.40: Parallels for Bantu **dòngò* ‘10’ in Cross River and Idomoid

Branch	Language	Form
Cross River	Ebughu	lùgò
Cross River	Efai	dùgù
Cross River	Ekit	dùgò
Cross River	Enwang	lùgù
Cross River	Etebi	dùgù
Cross River	Ilue	lògù
Cross River	Okobo	lùgù
Cross River	Oro	lùwù
Cross River	Uda	lùgù
Idomoid	Eloyi	dḡn· & ndḡn· (Koelle 1963[1854])

Other isolated forms for ‘ten’ include Atlantic (*n*)*taaj*, *taim*, *-suwan*, Mel *wi-tfɔ?*, Western Mande *tan* (< *‘5’?), Gur *kɛ(n)*, Kwa *bula* (cf. Ubangi *bale*), Ubangi *busa*, *sui*, Kordofanian *tu(l)*, *di*, *rakpac*, *fəŋən*, *tɪɾum*, Adamawa *kutu(n)* (< **kutu(n)*), cf. Laal *tūū*, Kordofanian *ʈΛΛ*, Sua *tɛŋi* etc.

5.11 Large numbers (‘twenty’, ‘hundred’ and ‘thousand’)

It is better to treat large numbers together for the following reasons:

First, these terms were probably lacking in Niger-Congo, so it comes as no surprise that they are often borrowed from European languages, Arabic, Hausa, Lingala or other “languages of influence”.

Secondly, these roots are often identical, i.e. the root that means ‘thousand’ in one language may mean ‘hundred’ or even ‘ten’ in another. Some of the forms simply denote ‘a large number’. The well-known migrating root *keme* that has the meaning ‘hundred’ in the majority of the Mande languages may be used with the meaning ‘eighty’ or even ‘sixty’ in other Mande languages.

However, each of the roots has its own characteristics.

In the majority of the NC languages, the term for ‘twenty’ goes back to lexical roots that mean ‘person’, ‘leader’, ‘body’, ‘head’, ‘grain’, ‘sack’ and ‘large number’. Numerous examples of this kind are discussed in Chapter 4. The etymology of those terms for ‘twenty’ that seem to be primary at the synchronic level should be sought with this in mind.

It can be safely stated that the terms for ‘hundred and ’thousand’ were absent in Proto-Niger-Congo. Thus, the pattern ‘twenty’ = ‘person’ remains the only reconstruction possibility for large numbers in Proto-Niger-Congo.

5.12 Proto-Niger-Congo

The reconstruction of the Proto-Niger-Congo number system may be summarized as follows (Table 5.41).

Table 5.41: Proto-Niger-Congo numeral system

1	ku-(n)-di (> ni/-in), do, gbo/kpo	7	5+2
2	ba-di	8	na(i)nai (< 4 redupl.)
3	tat/tath	9	5+4
4	na(h)i	10	pu/fu,
5	tan, nu(n)	20	< ‘person’
6	5+1		

This table summarizes our discussion. However, it is tempting to apply our conclusions to the evidence pertaining to particular families in order to identify the most archaic families, groups and branches within NC. Such a review of data within a wider NC context could also help, enhancing the intermediate reconstructions suggested in Chapter 4.

6 NC numbers as reflected in particular families, groups and branches

No new reconstructions are presented in this chapter that offer the alignment of intermediate reconstructions on the basis of wider Niger-Congo evidence and conclusions based on the reconstruction suggested earlier. Hopefully, these results will enable an evaluation of each of the families (or a group/branch when possible) with regard to the inventory of NC roots preserved in them. In addition, this may enhance our understanding of the NC linguistic taxonomy. We will begin our analysis with the Benue-Congo evidence (Table 6.1).

6.1 Benue-Congo

Commentary:

- Reflexes of the reconstructed NC forms are marked with /+/-/ in the table above.
- It should be repeatedly stressed that some of the etymologies accepted here are in need of further investigation and evaluation by experts. In case it is not clear whether the form is indeed a NC reflex, /+/-/?/ is used henceforward.
- Since the Bantu evidence is of great importance to our reconstruction, it is treated separately, i.e. the Bantoid (-B) section only includes forms attested in these languages except for those found in Bantu.
- The terms for ‘six’, ‘seven’ and ‘twenty’ are not present in the tables. The assumed NC patterns that are employed for them are typologically widespread, which means that the evidence pertaining to their reflexes will only mar the overall distribution picture.
- If a reflex is supposedly lacking, a selection of basic forms (interpreted as innovations) is provided.

6 NC numbers as reflected in particular families, groups and branches

Table 6.1: NC numerals reflected in Benue-Congo (+)

	1	2	3	4	5	8	10	Total
Nupoid	+	ba	+	+	+	5+3	+ ?	4
Defoid	+	+	+	+	+	jo/ ro	gwá	5
Edoid	kpa/ gwo	va	+	+	+ ?	+	gbe	4
Igboid	tù?	bó	+	+	+ ?	5+3	dfi/ri/li	3
Idomoid	+	pa	+	+	do/lo/ ro/ho	5+3	gwo	3
Kainji	+	+ ?	+	+	+	ro, 5+3	+	6
Platoid	+	+	+	+	+	+	kop	6
Cross	+	+ ?	+	+	+	+	+ ?	7
Jukunoid	jun, ʃíʃe, táj	pa(n)	+	+	+	+	+ ?	5
Bantoid (-B)	+ ?	pa/ba/fe	+	+	+	+	+	6
Bantu	+	+	+	+	+	+	kómì	6
Oko	-óré, -jére	-bòrè	+	+	-pi	+	+	4
Akpes	+ ?	+	+	+	+ ?	+	-yōf(i), *t-ēfi	6
Ikaan	ʃí	wa	+	+	+	+	+	5
Lufu	+ ?	máhà	+	+	+	5+3	+ ?	5

- The total number of Proto-Niger-Congo roots that have reflexes in each of the BC branches (out of the seven numbers represented in the table) is quoted in the rightmost column.

Table 6.1 demonstrates the following: If we accept this reconstruction, it appears that in only Cross-River do all seven terms discussed above directly reflect their NC prototypes, which makes this branch the most archaic within BC. Six terms out of seven represent NC reflexes in Kainji, Platoid, Bantoid, Bantu and Akpes. In other words, the Proto-NC numerical terms are better preserved in Eastern BC than they are in Western BC. It should be noted that only three terms out of seven have their reflexes in Idomoid and Igboid, i.e. they are the most distant from Proto-Niger-Congo among the languages under study.

Reflexes of ‘three’ and ‘four’ have been preserved in all BC branches. The reflection of ‘five’ is consistent as well. The same can be applied to ‘eight’ (the replacement of the pattern ‘8’ = ‘4 redupl.’ with ‘8’ = ‘5+3’ may have occurred independently in some of the branches).

Why the assumed reflexes of the Proto-terms for ‘two’ and ‘ten’ underwent a massive replacement is more difficult to explain. In the case of ‘ten’ a Proto-Western-BC innovation may be assumed, i.e. the replacement of **pu/fu* with **gbV/gwV*. This is applicable to the Nupoid form *wo* (represented as /+?/ in the table above) as it probably reflects the Western innovation **gwo* rather than **pu/fu*. This raises doubts as to whether our interpretation of the forms attested in Cross (**kpo*), Jukunoid (*wo*) and Lufu (*wo*) is correct (these forms were explained above as NC).

The reflexes of the Proto-NC term for ‘two’ are limited to 4–6 branches (out of the fifteen branches under study). At the same time, the forms that do not go back to **di* are phonetically quite homogeneous in both main groups of BC (*pa/ba/wa/va*). This suggests that the by-form of ‘two’ with the initial labial may have already existed at the Proto-BC level.

6.2 Kwa

Interestingly, Table 6.2 shows that some of the Kwa branches are exceptionally variable with regard to the reflection of Proto-NC terms. All seven Proto-terms under study have their reflexes in Ka-Togo, i.e. the Ka-Togo reconstruction is virtually identical to that of NC. However, Gan-Dangme has only the reflex of ‘three’ (assuming that *-tɛ* ‘3’ reflects NC **tath*). In Nyo, the majority of terms are replaced as well: it seems that only the terms for ‘three’ and ‘four’ have been preserved in Proto-Nyo, whereas the preservation of ‘ten’ (not speaking of ‘one’ and ‘eight’, let alone the terms for ‘two’ and ‘five’, since the reflexes of **di* ‘2’ and **tan* ‘5’ are not traceable in any of the Nyo branches) is questionable. This means (assuming Ka-Togo, Na-Togo and Gbe indeed belong to Kwa) we should assume that: 1) the innovations presented in the table above postdate the division of Proto-Kwa; 2) Proto-Ka-Togo was the first language to separate from Kwa, since many of these innovations are homogeneous. This line of reasoning is more difficult to follow in the case of Na-Togo, since Na-Togo shares its innovations for ‘two’ (**nyɔ*) and ‘five’ (**nu*) with Nyo and Ga-Dangme. In other words, the Kwa numbers provide valuable data for the alignment of the internal genealogy of the Kwa languages.

6 NC numbers as reflected in particular families, groups and branches

Table 6.2: NC numerals reflected in Kwa (+)

		1	2	3	4	5	8	10	Total
1.	Ga-Dangme	-kē, *go/wo	-ɲò(n)	+	-ɟwè	-nùṣ	6+2	ɲòŋmá	1
2.	Gbe	+	-wè	+	+	+	-ɲí, 'hand'+3	+	5
3.	Ka-Togo	+	+	+	+	+	+	+	7
4.	Na-Togo	+	-nyɔ	+	+	-no(N)	+	+	5
5.1.	Nyo-Agneby	+	-ɲɔ̃	+	+	-ne	-pyè, wo(n)	diw, 5PL	3
5.2.	Nyo-Attíé	kə(n)	mwə(n)	+	dʒí(n)	bə(n)	+	kɛɲ	2
5.3.	Nyo-Awikam	-t͡ʃ	-ɲ͡ʒ	+	+	-ɲú	-tyé	-jú	2
5.4.	Nyo-Alladian	-t͡ʃ	-yrè	+ ?	-zò	-nrì	-ɸrì	+ ?	2
5.5.1.	Nyo-Potou	*ce, b̃̀	-no͡ʒ	ja/je	+	na	ɸyá/ gɸí	+	2
5.5.2.	Nyo-Tano	ko(n)	-ɲɔ/- ɲu(n)	+	+	nu(n)	-kwé/ -cué	bulu, du	2

One important point that I would like to stress here is that if the Ka-Togo languages indeed belong to Kwa, we may state that our reconstruction of the NC number system is fully supported by the Kwa evidence.

It should be remarked that in a number of the Kwa branches the forms of 'five' interpreted as innovations in the table above could go back to an alternative NC prototype **nu(n)* '5' with its reflexes attested in Dogon, Gur and Adamawa.

Finally, I'd like to note that such a large-scale replacement of Proto-terms as in Nyo and Gan-Dangme (apparently etymologically related innovations) is a promising subject for both special investigation and discussion within the framework of a NC linguistics conference.

6.3 Ijo

The Ijo languages are closely related, hence they do not differ much in the reflection of Proto-NC numbers. An apparent innovation of Ijo is the term for 'two' (mààmV). As for the term for 'one', the reflexes of the NC prototype are distinguishable in the Ijo compounds die/zie/ie. In the case of 'ten' it is, however, unclear whether this form is an innovation or not, since it can also be reconstructed as **wo-(i)* based on **pu/fu*. The reconstruction *(w)oji < **ji is an alternative possibility that implies an innovation in Ijo.

Table 6.3: NC numerals reflected in Ijo (+)

	1	2	3	4	5	8	10
Defaka	gbéí	mààmà	+	+	+	5+3	+ ? (wóì)
East	*+, gbéí, ògèi	màmì	+	+	+	+	ójí /àtié
West	*+, kèni	maamɔ	+	+	+	+	ójí

In any case, the majority of the Proto-Ijo numbers can be traced to their NC prototypes.

6.4 Kru

Table 6.4: NC numerals reflected in Kru (+)

	1	2	3	4	5	8	10
Aizi	mumɔ, yre	-fi	+	yebi	-gbo	pate	bɔ
Eastern	+	sɔ	+	+	gbu / gbi	5+3	+, kɔgba
Kuwa	+	sɔr	+	+ ?	wàyɔɔ	5+3	kowaa
Seme	dyuɔ	nĩ	+	yur	kwɛ̃l	kprɛ̃n	+
Western	+	sɔn	+	+	-mm	+	+

The Proto-Niger-Congo forms are well-preserved in Western Kru (Bassa, Grebo, Klao, Wee). In other branches they are less well represented (especially in Aizi and Seme, where they are nearly completely replaced with innovations (except for the term for ‘three’) with reflexes attested in all the branches).

6.5 Kordofanian

This evidence leads to the conclusion that the number systems of the Kordofanian languages are hardly reconcilable with each other. Moreover, none of them seems to have inherited the NC system (with the exception of ‘three’ that apparently goes back to its NC prototype, cf. e.g. Katla $\lambda-t_{\bar{r}}t_{\bar{r}}$ ‘3’).

The NC root for ‘eight’ (< ‘4’) is not represented in the Kordofanian languages. The use of /+?/for Heiban and Talodi is only due to the fact that the Proto-NC

6 NC numbers as reflected in particular families, groups and branches

Table 6.5: NC numerals reflected in Kordofanian (+)

	1	2	3	4	5	8	10
Heiban	-(t)ʈɛ(k)	-can /- ʈan, rɔm	+	-ʈɔŋɔ/- ʈʈ	-dini, ɲer-	+ ?	di/ di/ ri
Katla	-ʈak	cik/ heek	+	-gɔɔɔm	-duliin, -gbəlm	ʈɔŋgɪl	*ʈɔɔ, -rɔ
Rashad	-tta	(k)ko(k	+	-rɔm	*ɲer-, -ram	dubba	5PL
Talodi	+? (lu(k)/ li(k))	-ʈak/-tta	+	-ʈandɔ, kekka	hand'- '1', -liəgum	+ ?	-tu(l), tiərum

pattern (8 = 4 redupl.) is traceable in them (rather than the form itself), cf. e.g. Warnang (Heiban) *ɲɛ-làmlàŋ* '4' > *ɲɛ-lamlaaŋ-ɔ* '8', Lumun (Talodi) *mɔ́ɔ̀rɪn* '4' > *má-m̀ɔ̀rɪn* '8'. This resemblance, however, may be due to typological (rather than etymological) reasons.

6.6 Adamawa

It is important to note that Adamawa is one of the most divergent families within NC, hence the remarks below.

First, despite the diversity of forms, reflexes of the NC prototypes are well represented in many of the branches, e.g. five terms out of the total seven are probably reflected in Mbum Bua, Waja Jen, Waja Waja and Waja Yungur. Like in other families, the terms for 'three' and 'four' are the best-preserved.

The table above may create an impression that the term for 'one' is well-preserved in Adamawa as well. This impression is, however, misleading, since multiple forms are reconstructible for 'one'. Moreover, numerical terms attested in particular Adamawa branches go back to a variety of forms (rather than one particular form) that may be unrelated to each other. Thus NC *di* '1' finds parallels in the following branches: Duru *dɔɔ*, Bua **lɛ* and possibly Laal *bɪ-dɪl*?. Its reconstructed allomorph **n-di* (with further evolution to **ni/-in*) may be reflected in Kam (-*ii*), Jen *-in*, Waja *-in*, Mumuye (?) *-ni*, Yungur (?) *-ni*. The terms reflected in Faló **-lo*, Bua *dɔ(ɲ)* and Kim *dú* may go back to the reconstructed NC form **do* '1'.

Table 6.6: NC numerals reflected in Adamawa (+)

	1	2	3	4	5	8	10
Fali	+	gbara, cuk	+	+	kêɛw	+	ra
Kam	+ ? (-ii)	-raak	+	+	ɲwún	sâl	+ ?
Leko Duru	+, ɲá	du/ru, to, te/re	+	+	nún-	5+3	+ ?, kob
Leko Leko	*ɲa	ra, in, nu	+	+	núún-	5+3	kob
Leko Mumuye	+ ?	ye, ti, ni	+	+	nɔŋ	5+3	kob
Mbum Bua	+	+	+	+	*lu, tɛ, *kɔn, tiso	+	do, kùtù
Mbum Kim	+	+ ?	+	ndà(y)	nūwēy	+	wàl
Mbum Mbum	böŋ/ búónó	ti, sede, gwa	+	+	ndifi	10-2	+ ?, dùɔ, -wàl
Mbum Day	ngɔ́ɲ, *mon	+	+	ndà, -yām	sēri	+	+ ?
Waja Jen	+	+ ?	+	+	nóob/ *na, *hwī	+	ǰóób
Waja Longuda	khal, twè	shir, kwé	+	+	nyó	nyíthìn	koo/kù
Waja Waja	+	+ ?	+	+	nu(ɲ)	+	kob
Waja Yungur	+	+	+	kurun	-nun	+	+ ?, kutun
Laal	+	(ʔi-si?)	māā	ǂi-sān	+ ?? (sāb, *swa-)	+	tūū

The forms observable in these two groups cannot be coalesced on the basis of the presently available evidence. Moreover, it bears reminding that the morphological analysis of the majority of the Adamawa numbers is uncertain. This problem cannot be solved at the moment since any firm criteria for distinguishing noun class affixes (or their traces) from the base are lacking.

The same is applied to the forms of ‘two’. The set of reflexes for the NC term **di* ‘2’ quoted in the table above is represented by the following isolated forms: Bua *di-di/ri*, Kim *zi/tfí-rí*, Day *dīi*, Jen **re / rá-b*, Waja *ró-b*, Yungur *raa-p*. Regardless of whether the final *-b* goes back to a suffix or is the result of alignment by analogy (both possibilities are discussed above), it is clear that the relationship of these forms deserves careful examination in the diachronic perspective.

‘Four’. This section of Table 6.6 is a result of our cautious treatment of the potentially related forms: the possibility that the forms of Kim-Day *nda* may go back to NC **na-* cannot be excluded.

The NC base **tan/ton* ‘5’ has not been preserved in any of the Adamawa languages (apart from the doubtful Laal form). On the contrary, reflexes of the alternative NC form **nu(n)* are clearly distinguishable in the majority of the mid-range NC families such as Dogon, Gur and Kwa, so they should have probably been marked with the plus sign in the table above.

As for the reflexes of ‘ten’ (NC **pu/fu*), it should be noted that all forms marked with the plus sign in the table originally had a voiced labial as their initial consonant: Adamawa **buu/buu*. The forms of Adamawa **ko-b* probably go back to NC **ko* ‘hand’.

6.7 Ubangi

Here, NC numbers are well-preserved in Banda and Gbaya-Nanza-Ngbaka (each of these branches has four reflexes out of seven) whereas in Ngbandi they have been totally replaced (except for *ta* ‘3’).

The following problematic forms that have been taken as NC reflexes can be reinterpreted as follows (with due attention to their morphological structure and phonetics):

NC **di* ‘1’: Banda *bà-lē?*, Ngbaka-Mba *bī-ni/bì-rì*, Zande *kí-lī*;

NC **pu/fu* ‘10’: Banda *bu-fu*, Gbaya *bú/bù-kə*. Whether the latter form is indeed a NC reflex is not clear (not only due to its phonetics but also because a lexical etymology is suggested for *bù*), e.g. Edouard Koya states that *bù* means ‘person’ in Bokoto (Central Gbaya-Manza-Ngbaka), where *bù-kə* ‘10’ (<https://mpilingweb.shh.mpg.de/numeral/Bokoto.htm>). Moniño suggests an alternative ety-

Table 6.7: NC numerals reflected in Ubangi (+)

		1	2	3	4	5	8	10
1.	Banda	+	-fi	+	+	-ndũ	5+3	+
2.	Gbaya- Nanza- Ngbaka	kpó(k)/ ndánj	wá?, -too	+	+	-(k)ó	+	+ ? (bú)
3.	Ngbandi	kə(i)	se	+	siə	kɔ̃/ kũ	miambe	sui, bàlé
4.1.	Ngbaka- Mba	+, kpó-	-fi/-si	+	+	ve/ vue	5+3	<'hand'
4.2.	Sere	njēe	so	+	+	vo	5+3	<'hand'
5.	Zande	+	-jō/-yō	+	lu ?	-sibē/- sùè	5+3	ngbɔ̃

mology (Moñino 1995: 656): «**bú* ‘dix’ est en relation avec **bú* ‘façonner, faire un cercle, joindre les mains’ ; la série partielle **bú-kɔ̃* ‘joindre-mains’ est encore plus explicite, et décrit le geste qui accompagne l’énonciation du chiffre 10 chez tous les locuteurs». The following meanings of *bú* in Gbaya are provided in (Blanchard & Noss 1982: 51):

- *bú* «joindre les deux extrémités d’une même chose ; faire de la poterie»,
- *bú* «dix, s’exprime en joignant les doigts de chaque main et en faisant toucher l’une de l’autre».

It is entirely possible that we are dealing with an innovation that follows the pattern described by Moñino. However, similar forms attested in other families may suggest that as finger counting developed, the secondary merger of homonyms occurred.

Finally, the Proto-Ubangi terms for ‘two’ (**se/so*) and ‘five’ (**ko/vo*, possibly a derivative from ‘hand’) should be mentioned as possible shared innovations.

6.8 Dogon

The Dogon numbers are quite homogeneous, so there is probably no need to treat them by branch. Instead, they will be compared to the numerical terms attested in the Bangime language that is considered a NC isolate.

Table 6.8: NC numerals reflected in Dogon

	1	2	3	4	5	8	10
Dogon	túru/ tumɔ, ti(i)	+ ?	+	+	núnéé	gá(a)rà	péru/ pélu
Bangime	tòré / tǝyé	+ ?	+	+	nǔndí	(borrowed)	kúré

Dogon. The forms $lé(y)/né(y)$ (with their allomorphs $lɔ(y)/nɔ(y)$) may be viewed as reflexes of NC $*di$ ‘2’. The reflex of NC $*tan/ton$ ‘5’ is lacking in Dogon, but the basic form quoted in the table above corresponds to the alternative NC root $*nu(n)$ widely attested in a number of NC families. The term for ‘ten’ can be compared to $*pu/fu$, but this comparison should be substantiated. As previously stated, the reflexes of ‘three’ (Dogon $*taan$) and ‘four’ (Dogon $*nay(n)$) appear to be the most consistent, which clearly identifies Dogon as a member of the NC family.

Bangime. The Bangime numbers are virtually identical to those of Dogon as far as their etymology is concerned. The form $jindò$ ‘2’ may be a palatalized reflex of $*di$. The term for ‘eight’ ($sàgín$) is a borrowing from Mande (just as in Dogon where a by-form of this primary term ($sagi$) is widely attested). The only Bangime term that is markedly different from the one found in Dogon is ‘ten’.

6.9 Gur and Senufo

Evidence of the ten Gur branches is treated in Table 6.9 (cf. the discussion pertaining to the division of Gur into 16 branches in Chapter 4).

The Southern branch of Central Gur (Dogoso-Khe, Gan-Dogose, Grusi, Kirma-Tyrama) has preserved most of the NC terms (six out of the total seven), whereas its Northern branch (Bwamu, Kurumfe, Oti-Volta) preserved five. The NC numbers are well-represented in Teen and Wara-Natiro as well. Nearly the entire inventory of NC terms was replaced in Senufo (except for ‘three’ – Senufo $*tãã/taàr$), Bariba (except for $i-ta$ ‘three’ and $n-ne$ ‘four’) and Kulango (except for na ‘four’ and to ‘five’). At the same time, Kulango and Teen seem to be the only languages that have a reflex of NC $*tan/ton$ ‘5’.

As we have seen, the NC numbers are well-preserved in Gur, the more so that an alternative root for ‘five’ ($*nu(n)$) is distinguishable in at least four NC families. Its reflexes are attested in Bariba, Central, and Senufo. In view of this, it can be stated that all seven Proto-NC terms are reflected in Southern Central.

Table 6.9: NC numerals reflected in Gur and Senufo (+)

	1	2	3	4	5	8	10
1. Bariba	tiā	Ru	+	+	nòòbù	5+3	-kuru
2.1. Central Northern	+	+, pū	+	+	nu	5+3, tɔɔ, ni	+
2.2. Central Southern	+	+, pɔ/ jɔ	+	+	nɔ(n)	+	+
3. Kulango	*taà	nyɔ̀ò	(borrowed)	+	+	5+3	5PL, *ji
4. Lobi-Dyan	+	nyɔ̀(n)	+	+	mòì/ *mà, dièmà	5+3	-kpo, nyòòr
5. Senufo	ngbe, nikĩ	sin/ sun	+	tésyàr, ...	-no	5+3	kɛ
6. Teen	tani	Nyor	+	+	+	5+3	+ ?
7. Tiefó	+	jɔ̀	+	ʔuʔɔ̀ / ɲɔ̀	kǎ	5+3	kɛ̀
8. Tusia	nónki	nĩɲ	+	+	k(w)lɔ̀	5+3	*gbɔ̀/ bwɔ̀
9. Viemo	+ ?	Niinĩ	+	jumĩ	*kɔ̀	+	kwɔ̀mũ
10. Wara-Natioro-Paleni	pɔ̀	nínité, bó	+	+	sùsù, sV	+	+

The term for ‘one’ is marked with the plus sign in reference to the reflexes of NC **do* (Central, Lobi-Dyan, Viemo) or NC **di* (Central, Tiefó).

Proto-Oti-Volta (Northern Central) **li/yi* and Proto-Grusi (Southern Central) **le/le* forms are considered to be reflexes of NC **di* ‘2’. Other forms of ‘two’ listed in the table represent a common (Proto-Gur ?) innovation **nyo/jo* / (*ni* ?).

The Kulango term for ‘three’ (*sāābe*) must be a borrowing from Mande.

The innovations for ‘4’ are isolates that are irrelevant to the grouping of branches within the Gur family.

Some innovations for ‘five’ may go back to the lexical root for ‘hand’ (< **ko*).

The pattern for ‘eight’ (= ‘4 redupl.’) is preserved in three of the branches.

In the case of ‘ten’, the similarity between the Senufo and Tiefó innovative forms is noteworthy.

6.10 Mande

This is no doubt the most isolated family in what pertains to the reflection of NC numbers (Table 6.10). The maximum number of reflexes attested in particular branches does not exceed three (out of the total seven). In some of the branches, only two terms have been preserved. At the same time, the branches are quite compact, which enables us to discuss shared innovations within the Proto-Mande number system. The question as to whether these Proto-Mande innovations are of a lexical or morphological nature remains.

The most ‘radical’ etymological scenario is as follows:

The term *kedən* ‘1’ could be explained as going back to **ku-den*, which correlates well with the Proto-NC form **ku-di(n)* (with *ku-* being the most likely Proto-NC noun class prefix (class 1)).

The term *do* ‘1’ is in line with the alternative NC root **do* ‘1’ (without a noun class marker).

The Mande term **fida/fide* could be interpreted as going back to **fi-de* (assuming the first syllable reflects a noun class, e.g. CL 19).

The term for ‘three’ could be interpreted as a compound, one that has a reflex of **ta* ‘3’ (< **tath*) as its first component (the second component remains unidentified).

The Mande term for ‘ten’ (**tan*) as found in Western Mande may be a reflex of the Proto-NC form **tan* ‘five’ with a semantic shift **5* > ‘5PL’ (=‘10’). Moreover, its original form may have been preserved in Jowulu.

Any of these bold assumptions may prove true, but presently none of them is substantiated enough, so they are better left for future discussion in the hope that over time more pertinent evidence will become available. In this respect, the study of Samogo and Jowulu looks promising, the more so that the lack of an up-to-date linguistic investigation of these languages, as far as I know, has been a sore gap in present day comparative-historical studies of the Mande languages. In addition, these languages are the only ones that seem to preserve reflexes of both NC terms for ‘five’ (NC *tan/ton* and **nu(n)*). Moreover, the Jowulu terms that have [p-] ~ [b-] allomorphs may reflect a noun class prefix (the choice between p- and b- depends on the following consonant, i.e. [p-] appears before a voiceless consonant (cf. *p-firɛ* ‘4’) whereas [b-] appears before a voiced consonant (*b-zei* ‘3’, *b-ʒiĩ* ‘10’).

Table 6.10: NC numerals reflected in Mande (+)

	1	2	3	4	5	8	10
Manding	+, *kélén	*filá	*sábá	+	dúuru, *wo	séegi	+ ?, *tán
Jogo-Jeri	+, *kɛɛ ?	*fálá	sègbá	+	sóólò	5+3	táà(n), ta
Mokole	+, *kéle	*fila	saba	+	lóolu, *wo	séen/ seyi	+ ? , tán
Vai-Kono	+, *N- kélén	*fèLá	sagba	+	dúʔu/ sóó(ʔ)ú	séin, 5+3	tân
Susu	*kédén, ndá/ nde	*fidín	sawa/ sàxán	+	sùlù, *fò	5+3	+, *tòngó
SWM	*giláaŋ, *tà	*fèelé	sāabā	+	dóólú, *wo/ ngò	5+3	+
Bozo-Soninke	ke/ kuɔn, sana, ...	pě:ndé/ fillò	sike/ síkkò	+	kóló- /kára-	segi	tan
Bobo	tàlá/ télé	pálà	sàà	+	kóò	séki/ tʃèkí	+, m̩m̩
Samogo	*ké, *so	fí:(kí)	zì:gī, f̩wè, yei	+	+	+, kàà	t(s)eu/ ceũ
Jowulu	těēna/ tenn	fuuli	bzei <*jɔnn/ i ?	p-f̩rɛ	+	2+'to lose'	bzĩ / byinn
SE East	+, gòon	*pela	ców, ʔàà- kõ	sì/ síirí	*sodu	+ ? , 5+3, sípe	+, kwi
SE South	+	*p̩i- lāŋ	*yààká	*y̩i- s̩i̩yá	sóódú	5+3	+, ko, sójólú

6.11 Mel

The numeral system of the proto-language is generally poorly preserved in both of the Mel groups. However, it should be noted that the most apparent innovations ('four' and 'two') are found in both groups, thus being important isoglosses useful to the assessment of Proto-Mel.

Table 6.11: NC numerals reflected in Mel (+)

	1	2	3	4	5	8	10
North	+	-rəŋ	+	-ŋkile/-nlɛ	< 'hand' ? ~ (-mV- ?)	5+3	+
South	+ ?	tsiŋ / tiŋ	+	hiɔl	wan/ wen	5+3	5PL

/~/in the section dealing with the Northern Mel term for 'five' indicates that it allows for a two-fold morphological analysis, namely *kə-ta-maŋ* (< **kə-ta*+*suffix* < root *ta* 'hand'?) or (< *kə-ta-m-aŋ* < root *mV*).

In the Northern group, as well as in a number of other NC families, the term for 'one' is reconstructible as CL-*in* '1' (< NC **n-di*). The forms reconstructed for the Southern group include **lɛ*, **lɔ* '1' (< **di*, **do*). Languages of the Northern group preserve the basic form of 'ten', cf. Landuma *pù* '10', Temne '10'.

6.12 Atlantic

The Atlantic languages comprise two major groups, namely Northern and Bak (the members of the latter are highlighted in grey in the table above).

The Proto-NC numbers are generally better represented in Northern rather than in Bak (cf. the distribution of data pertaining to 'three', 'four' (generally the most persistent terms) and 'ten' in the table above). The only Northern sub-group where the Proto-NC numbers are poorly preserved is Cangin, while Fula-Sereer, Tenda, Wolof and Nalu are the most conservative.

The distribution of reflexes and innovations presented in the table above suggests the following historical development:

Reflexes of all major Proto-NC terms were present in Proto-Atlantic. The distribution of the terms for '1' may point to the existence of two dialect zones. A form that goes back to NC *(*n*)-*di* '1' became predominant in the ancestral dialect of Proto-Northern, whereas in the ancestral dialect of Proto-Bak the main form was NC **do* '1'. A specific phonetic (or morphological?) innovation of Proto-Atlantic (in contrast to NC) is the presence of the final *-*k* in its numerical terms.

Table 6.12: NC numerals reflected in Atlantic

	1	2	3	4	5	8	10
Cangin	no	nak	haj	+	<'hand', ?i:p	5+3	da:ŋkah
Nyun	+ ?	nak	+	+ ?	<'hand'	5+3	<'hands'
Buy	nɔ?, tee-	naŋ	+	+ ?	+ ?	5+3	ntaajä
Jaad- Biafada	+	ke	jo/ caw	+	<'hand'	5+3	+
Tenda	+, mbɔ	ki	+	+	<'hand'	5+3	+
Fula- sereer	+	+	+	+	+ ?, jo(w)i	5+3	sapp- o, xarb-
Wolof	+	X-aar	+ ?	+	jurom	5+3	+
Nalu- BF- BMB	+, mbó	+	+	+	<'hand', ribə(l)	5+3	*a- lafañ?
Joola	+	*- ʎubə?	-feegir	-bääkiŋ	+	5+3	- ntaaja
Manjak	+	-təb, pugut	-jent	baakər	<'hand'	+	(n)taaja
Balant	-ɔda?	*- ʎubə?	(borrowed)	tasala	jüf	+	jimmín
Bijogo	+?	*- ʎubə?	<'fingers'	-agenək	<'hand'	5+3	<'hands'

Proto-Northern inherited all basic Proto-Atlantic terms that go back to NC prototypes.

The term for '2' has been preserved in Peul-Sereer (**di-k* '2') and in Nalu (in all three languages). A (shared?) innovation developed in Cangin and Nyun-Buy (**na-k* '2'). Another innovation is characteristic of Tenda-Jaad-Biafada (**ki* '2').

The terms for 'three' and 'four' have been preserved in the majority of the Northern Atlantic languages (cf. e.g. Proto-Fula-Sereer **tati-k* '3', **na(y)i-k* '4').

The NC root **tak/tok* '5' is probably reflected only in Fula-Sereer (**be-tV-k*) and Buy (*ju-roo-g*, cf. Wolof **ju-rom* ?). In the majority of the Northern languages the original form was replaced with the pattern '5' < 'hand', which may have influenced the replacement of the pattern **'8* = '4 redupl.' with '8' = '5' (hand') + 3.

The term for ‘10’ has been preserved in three sub-groups (Wolof **fu-kk*, Tenda **pə-xw*, Jaad-Biafada **po*). In the remaining sub-groups it is replaced with isolated innovations.

The Proto-Bak numeral system underwent dramatic changes.

The original term for ‘two’ was replaced with the innovation *-tubə?* ‘2’, with its reflexes being traceable in three out of four sub-groups.

The reflexes of the Proto-NC terms for ‘three’ and ‘four’ are lacking. Moreover, a shared innovation *baakər* ‘4’ is observable in Joola-Manjak.

The original term for ‘five’ has been preserved in numerous Joola dialects, including Bayot (Proto-Joola **fu-tə-k* ‘5’).

The Proto-pattern ‘8’ < ‘4’ has been preserved in Manjak (Mankanya *ηi-bakir* ‘4’ > *bakr-êη* ‘8’, Pepel *η-uakr* ‘4’ > *bakar-i* ‘8’) and Balant (despite the fact that the original term for ‘four’ was replaced with an innovation in this language, cf. Balant Ganja *tállá* ‘4’ > *táhtállà* ~ *tántállà* ~ *táttállà* ‘8’ as recorded by Denis Creissels).

The term for ‘10’ was replaced with innovations. Here (just as in the case of ‘4’) we have another shared Joola-Manjak innovation (*ntaaja*). This seems to be another solid argument in favor of grouping these languages together.

6.13 West African NC isolates

We will conclude with an overview of the number systems attested in three NC isolates. These languages are traditionally grouped together with Mel or Atlantic (for seemingly no substantial reason, see Pozdniakov & Segerer 2007).

Table 6.13: NC numerals reflected in Sua (+)

1	2	3	4	5	8	10
sɔn	cen	+	+	sɔŋgun	5+3	tɛŋi

The reflexes of ‘three’ and ‘four’ have been preserved in Sua (*b-rar* and *b-nan* respectively). It should be noted that the innovation for ‘two’ is comparable to that found in Mel.

The term for ‘ten’ is possibly a borrowing from Mande *tan* ‘10’.

The term for ‘five’ may reflect the alternative NC root **nu(n)* ‘5’ (Gola *nɔ̀nɔ̀ŋ*).

The forms for ‘five’ and ‘ten’ in the Koelle records include [-f]: *ta-sóóf* ~ *ka-sóóf* ‘5’, *koof* ‘10’.

Table 6.14: NC numerals reflected in Gola (+)

	1	2	3	4	5	8	10
Gola	guùŋ	tì-yèe(l)	+	+	+	5+3	zìyà

Table 6.15: NC numerals reflected in Limba (+)

	1	2	3	4	5	8	10
Limba	-nthe	+	+	+	bi-schi	5+3	kchi

The form *bi-le* ‘two’ is noteworthy in that it may be interpreted as a direct reflex of NC **be-di* ‘2’.

6.14 Summary

The results of our reconstruction of the basic numeral terms are presented in Table 6.16.

- The lack of a NC reflex in a particular family or branch is highlighted in grey.
- The number of Proto-NC terms (out of nine listed in the table) with reflexes in a particular family or branch is given in the rightmost column.
- The number of branches (out of the total nineteen) with a reflex of a particular proto-form is provided in the lowermost row.

Our step-by-step reconstruction has yielded the following results.

The terms for ‘three’ and ‘four’ (**tath* ‘3’ and **na(h)i* ‘4’ respectively) are, as expected, the most stable within the NC number system. Their reflexes are rarely absent.

Surprisingly, the term for ‘2’ appears to be the least persistent (the more so that this is the only numerical term on the Swadesh list). The reconstructed root for ‘two’ (**di* ‘2’) is traceable in nine (out of nineteen) branches only. This may raise doubts as to whether the proposed reconstruction is correct. However, as we have tried to demonstrate above, no alternative reconstruction suggests itself on the basis of available evidence. The term for ‘2’ shows a great variety of forms, at the

6 NC numbers as reflected in particular families, groups and branches

Table 6.16: Niger-Congo numerals reflected in various families (+)

PROTO-NC	1 *(n)-di	1 *do	2 *di	3 *tath	4 *na(h)j	5 *tan	5 *nu(n)	8 < '4'	10 *pu	Total
Bantu	+		+	+	+	+		+		6
Bantoid (-Bantu)	+?		+?	+	+	+		+	+	7
BC (-Bantoid)	+		+?	+	+	+		+	+	7
Kwa	+		+?	+	+	+	+	+	+	8
Ijo	+			+	+	+		+		5
Kru		+		+	+		+?		+	5
Kordofanian				+				+		2
Adamawa	+	+	+	+	+		+	+	+?	8
Laal	+					+?		+		3
Ubangi	+			+	+			+?	+?	5
Dogon			+	+	+		+			4
Gur	+	+	+	+	+	+?	+	+?	+	9
Mande		+			+	+?	+??		+	5
Mel	+?	+?		+					+	4
Atlantic North	+		+	+	+	+			+	6
Atlantic Bak		+				+		+		3
Sua				+	+	+?				3
Gola				+	+		+			3
Limba			+	+	+	+?				4
Total	11	6	9	16	15	12	7	11	9	

same time being surprisingly persistent in particular branches (and other times rather divergent). Thus, the apparent Mande innovation **pila/fila* '2' is present in all Mande languages.

The most conservative NC branches in terms of the reflection of Proto-NC numbers are Gur, Adamawa and Kwa. All bases/patterns listed in the table have been preserved in Gur, including the alternative bases for 'one' and 'five'. The only reflex that is missing in Adamawa (as well as in Ubangi) is **tan/ton* '5'. All

Proto-terms have their reflexes in Kwa (except for the alternative base for ‘one’, i.e. **do*).

The inventory of the Proto-NC terms is well-preserved in the Bantoid languages, with only two alternative bases lacking (**do* ‘1’ and **nu(n)* ‘5’). These reflexes are missing in other BC branches outside the Bantoid languages as well. The reflex of **pu* ‘10’ is not present in Bantu as it was replaced with the Bantoid innovation **kum/kam/ɣam* (Proto-Bantu **kómì/kámá* ‘10’).

It would seem improper to define the branches with the lowest number of NC reflexes as the most distant from Proto-NC. The probability of finding a reflex of a NC-prototype in an isolate (e.g. Gola or Laal) is much less than, say, in the huge Benue-Congo family. At the same time, the massive replacement of numerical terms in the small West African branches such as Bak (Atlantic), Mel and Dogon is noteworthy.

The Kordofanian languages are the most remote from Proto-NC, as the only term with a NC prototype attested in them is *tath* ‘3’. The term for ‘8’ is based on ‘4’, which may be seen as another bond between Kordofanian and Proto-NC. However, this pattern may have developed in Kordofanian independently.

6.15 Conclusion

In conclusion, I would like to highlight the thesis that I personally consider to be the most important. For me, the current study is an experimental project that aspires to demonstrate what can be done (if anything) in terms of the NC reconstruction, given that a step-by-step reconstruction is not available for all the families and branches of this macro-family.

In this experiment, the emphasis was placed on providing an exhaustive account of the distribution of forms by families, groups and branches. Quasi-reconstructions of Proto-NC numbers that resulted in the process should be viewed as mere possibilities. My intention was to present evidence that the reconstructions offered in this book are more probable than any others.

The author sees his major goal as providing a substantial discussion of the most likely reconstructions of Proto-NC numbers, in the hope that linguists specializing in particular NC families (as well as those who provide speculative ‘etymologies’) will finally join the debate. Chapter 4, which is the lengthiest and the most important chapter of the book, contains ‘technical proposals’ regarding the reconstruction of numbers within each of the numerous branches of the macro-family. I would like to thank the specialists who kindly joined the discussion while the book was still in preparation and whose opinions were duly

accounted for. I would be grateful if other specialists critically examined the evidence presented in this book and gave their evaluation of data that lies within their competence. Hopefully, this will give way to the real reconstruction of the NC number system. Today it is evident that plausible reconstructions in terms of a macro-family that comprises one and a half thousand languages can only result from the cooperation of dozens of specialists. This book aims at providing data for such an effort.

I hope that the methodology tested in this book will be of use for the reconstruction of the NC lexicon in general. In any case, the author sees no other way of approaching this objective of utmost importance in the coming decades.

Appendix A: Groupings of numerals by noun classes in 254 BC languages

Table A.1: Akpes

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Akpes	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	8	9	1-7,10

Table A.2: Bantu A

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
A10	Akoose	1-5	1-5	1-5	1-5	1-5	6	Ø	Ø	9	Ø?
A10	Bakaka	1,6	2-5	2-5	2-5	2-5	1,6	Ø	Ø	9	Ø?
A10	Oroko	1,9	2-8	2-8	2-8	2-8	2-8	2-8	2-8	1,9	10
A20	Duala	1	2-5	2-5	2-5	2-5	6	7	8	9	Ø?
A30	Batanga	1 Ø?	2-5	2-5	2-5	2-5	6	7	Ø?	9	Ø?
A30	Benga	1	2-5	2-5	2-5	2-5	6	7	8	9	Ø?
A40	Bakoko	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	Ø?
A40	Bankon	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
A40	Barombi	1 Ø?	2-6	2-6	2-6	2-6	2-6	7-8,10	7-8,10	9	7-8,10
A70	Bebil	1,10	2-5	2-5	2-5	2-5	6	7	Ø	9	1,10
A70	Mengisa	1	2-5	2-5	2-5	2-5	6	7	Ø	9	10
A80	Bekwil	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	Ø
A80	Bomwali	1 Ø?	2-5	2-5	2-5	2-5	Ø	Ø	8	Ø < 8	Ø
A80	Byep	1 Ø?	2-5,9	2-5,9	2-5,9	2-5,9	Ø	Ø	8	2-5,9	Ø
A80	Gyele	1-4,6	1-4,6	1-4,6	1-4,6	Ø	1-4,6	7	Ø	9	Ø
A80	Koonzime	1 Ø?	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	Ø
A80	Ngumba	1 Ø?	2-6	2-6	2-6	2-6	2-6	7	Ø	9	Ø
A90	Kako	1 Ø?	2-5	2-5	2-5	2-5	Ø < 5	Ø < 6	Ø < 7	Ø < 8	Ø
A90	Kwakum	1 Ø?	2-5	2-5	2-5	2-5	Ø?	Ø?	Ø?	Ø?	Ø?

A Groupings of numerals by noun classes in 254 BC languages

Table A.3: Bantu B

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
B10	myene	1	2-4?	2-4?	2-4?	5-7	5-7	5-7	8-9	8-9	10
B20	Kélé	1,10	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	1,10
B20	Mwesa	1	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	8	2-7,9	Ø?
B20	Ntumbede	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	Ø?
B20	Sake	1	2-5,7	2-5,7	2-5,7	2-5,7	6	2-5,7	8-9	8-9	Ø?
B20	Wumbvu	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9	10
B40	Barama	1,8	2-7	2-7	2-7	2-7	2-7	2-7	1,8	9	10
B40	Lumbu	1	2	3-9	3-9	3-9	3-9	3-9	3-9	3-9	Ø
B40	Punu	1,7-9	2-6	2-6	2-6	2-6	2-6	1,7-9	1,7-9	1,7-9	10
B40	Sangu	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
B40	Sira	1,8	2-7	2-7	2-7	2-7	2-7	2-7	1,8	9	10
B60	Ngul	1	2-6	2-6	2-6	2-6	2-6	7	8	9	Ø?
B70	Ngungwel	1,3-6	2	1,3-6	1,3-6	1,3-6	1,3-6	7-8	7-8	9	Ø?
B70	Teke-Nzikou	1,3-6	2	1,3-6	1,3-6	1,3-6	1,3-6	7-8	7-8	9	Ø?
B70	Teke-Tege	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
B70	Teke-Tyee	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9-10	9-10
B80	Tiene	1	2	3-4,6,8	3-4,6,8	Ø	3-4,6,8	7	3-4,6,8	9	10
B80	Mbuun	1	2	3-6,8-10	3-6,8-10	3-6,8-10	3-6,8-10	7	3-6,8-10	3-6,8-10	3-6,8-10
B80	Mpiin	1	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	7	2-6,8-9	2-6,8-9	Ø
B80	Nzadi	1	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	7	2-6,8-9	2-6,8-9	Ø?
B80	Nsong	1	2-6,8-10	2-6,8-10	2-6,8-10	2-6,8-10	2-6,8-10	7	2-6,8-10	2-6,8-10	2-6,8-10
B80	Songo	1	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	2-6,8-9	7	2-6,8-9	2-6,8-9	Ø

Table A.4: Bantu C

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
C20	Bongili	1	2-6,9	2-6,9	2-6,9	2-6,9	2-6,9	7	8	2-6,9	10
C30	Mbosi	1,6	2,9	3-5	3-5	3-5	1,6	7	8	2,9	10
C40	Bangala	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
C40	Bamwe	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
C40	Bolondo	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
C40	Budza	1-5	1-5	1-5	1-5	1-5	6,8	7	6,8	9-10	9-10
C40	Lingala	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
C40	Lobala	1,6	2-5	2-5	2-5	2-5	1,6	7	8	9-10	9-10
C40	Sakata	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	10
C40	Sengele	1	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	8	2-7,9	10
C50	Ngombe	1	2-6,9	2-6,9	2-6,9	2-6,9	2-6,9	7	8	2-6,9	10
C50	Pagibete	1,6	2-4	2-4	2-4	5	1,6	7	8	9	10
C70	Mongo-Nkundu	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
C80	Tetela	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9-10	9-10
C90	Bushong	1	2-6	2-6	2-6	2-6	2-6	7	8,10	9	8,10
C90	Ndengese	1	2-8	2-8	2-8	2-8	2-8	2-8	2-8	9	10
C90	Lele	1	2-4,6-7	2-4,6-7	2-4,6-7	Ø	2-4,6-7	2-4,6-7	8,10	9	8,10

Table A.5: Bantu D

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
D10	Lengola	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
D20	Bali (Kibali)	1	2-3	2-3	4	5	6	7	8	9	10
D20	Lika	1	2-4,6-7	2-4,6-7	2-4,6-7	5,9	2-4,6-7	2-4,6-7	8	5,9	10
D20	Zimba	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9	10
D30	Bhele	1-5	1-5	1-5	1-5	1-5	6,10	7,9	8	7,9	6,10
D30	Budu	1	2-5,8	2-5,8	2-5,8	2-5,8	6-7	6-7	2-5,8	9	10
D30	Nyali	1	2-3	2-3	4,9,10	5	6-7	6-7	8	4,9,10	4,9,10

Table A.6: Bantu E

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
E10	Gusii	1	2-8,10	2-8,10	2-8,10	2-8,10	2-8,10	2-8,10	2-8,10	9	2-8,10
E10	Ikoma	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
E10	Kabwa	1-6	1-6	1-6	1-6	1-6	1-6	7-8	7-8	9	10
E10	Ngoreme	1-2	1-2	3-6,8-10	3-6,8-10	3-6,8-10	3-6,8-10	7	3-6,8-10	9	3-6,8-10
E10	Suba	1	2-5,10	2-5,10	2-5,10	2-5,10	6-8	6-8	6-8	9	2-5,10
E10	Simbiti	1-6	1-6	1-6	1-6	1-6	1-6	7-8	7-8	9	10
E10	Sizaki	1	2-6,8,10	2-6,8,10	2-6,8,10	2-6,8,10	2-6,8,10	7	2-6,8,10	9	2-6,8,10
E10		1-6,8-10	1-6,8-10	1-6,8-10	1-6,8-10	1-6,8-10	1-6,8-10	7	1-6,8-10	1-6,8-10	1-6,8-10
E20	Embu	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
E20	Kikamba	1-5,10	1-5,10	1-5,10	1-5,10	1-5,10	6	7	8	9	1-5,10
E20	Gikuyu	1	2-6,8,10	2-6,8,10	2-6,8,10	2-6,8,10	2-6,8,10	7	2-6,8,10	9	2-6,8,10
E20	Chuka	1,3-6,8,10	2	1,3-6,8,10	1,3-6,8,10	1,3-6,8,10	1,3-6,8,10	7	1,3-6,8,10	9	1,3-6,8,10
E20	Meru	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
E30	Gweno	1-5,10	1-5,10	1-5,10	1-5,10	1-5,10	6-8	6-8	6-8	9	1-5,10
E30	Machame	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
E30	Mochi	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
E30	Rwa	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
E30	Vunjo	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
E40	Nata	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
E40	Pokomo	1-8	1-8	1-8	1-8	1-8	1-8	1-8	1-8	9	Ø

Table A.7: Bantu F

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
F10	Bende (dial.)	1-5	1-5	1-5	1-5	1-5	6-8	6-8	6-8	9	10
F10	Fipa	1-3	1-3	1-3	4-10	4-10	4-10	4-10	4-10	4-10	4-10
F10	Gongwe	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9	10
F10	Rwila	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9	10
F20	Konongo	1-5	1-5	1-5	1-5	1-5	6-8	6-8	6-8	9-10	9-10
F20	Sukuma	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
F30	Rangi	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	1-6,8,10	7	1-6,8,10	9	1-6,8,10
F30	Nilamba	1-5	1-5	1-5	1-5	1-5	6-8	6-8	6-8	9	10
F30	Nyaturu	1	2-5,10	2-5,10	2-5,10	2-5,10	6-8	6-8	6-8	9	2-5,10

A Groupings of numerals by noun classes in 254 BC languages

Table A.8: Bantu G

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
G10	Gogo	1	2	3-5,9-10	3-5,9-10	3-5,9-10	6-8	6-8	6-8	3-5,9-10	3-5,9-10
G20	Asu	1-4,6-8	1-4,6-8	1-4,6-8	1-4,6-8	5	1-4,6-8	1-4,6-8	1-4,6-8	9	10
G20	Shambala	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9	10
G30	Luguru	1	2-5,8	2-5,8	2-5,8	2-5,8	6	7	2-5,8	9	10
G30	Mushunguli	1	2-4	2-4	2-4	5	6	7	8	9	10
G50	Ndamba	1	2-5	2-5	2-5	2-5	6	7	8	9	10
G60	Bena	1	2-5	2-5	2-5	2-5	6-9	6-9	6-9	6-9	10
G60	Hehe	1	2-5	2-5	2-5	2-5	6-8	6-8	6-8	9-10	9-10
G60	Pangwa	1	2-5	2-5	2-5	2-5	6	7	8	9	10

Table A.9: Bantu H

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
H10	Kikongo	1	2	3-7,10	3-7,10	3-7,10	3-7,10	3-7,10	8-9	8-9	3-7,10
H30	Ngongo	1,7	2-6	2-6	2-6	2-6	2-6	1,7	8-9	8-9	10

Table A.10: Bantu J

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
J10	Chiga	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Gungu	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Gwere	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Hema	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Lubwisi	1-5,10	1-5,10	1-5,10	1-5,10	1-5,10	6-9	6-9	6-9	6-9	1-5,10
J10	Nyoro	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Nyankole	1-5,10	1-5,10	1-5,10	1-5,10	1-5,10	6-9	6-9	6-9	6-9	1-5,10
J10	Soga	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J10	Toro	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J20	Haya	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J20	Jita (dial.)1	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
J20	Jita (dial.)2	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J20	Kara	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
J20	Kwaya	1-6	1-6	1-6	1-6	1-6	1-6	6-8	6-8	9	10
J20	Nyambo	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
J30	Bukusu	1	2-5	2-5	2-5	2-5	6	7	8	9	10
J30	Idakho	1	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	2-7,9	8	2-7,9	10
J30	Logooli	1	2-5	2-5	2-5	2-5	6	7	8	9	10
J30	Luyia (dial.)1	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	10
J30	Luyia (dial.)2	1	2-6	2-6	2-6	2-6	2-6	7	8	9	10
J30	Nyore	1,9	2-6	2-6	2-6	2-6	2-6	7-8	7-8	1,9	10
J30	Masaba (dial.)1	1	2-6	2-6	2-6	2-6	2-6	7-9	7-9	7-9	10
J30	Masaba (dial.)2	1	2-6	2-6	2-6	2-6	2-6	7	8-9	8-9	10
J30	Nyole	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
J40	Nande	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	1-7,10	8-9	8-9	1-7,10
J50	Shi	1	2-5	2-5	2-5	2-5	6-9	6-9	6-9	6-9	10
J50	Tembo	1	2-5,7	2-5,7	2-5,7	2-5,7	6,8-9	2-5,7	6,8-9	6,8-9	10
J60	Ha	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	10
J60	Rwanda	1	2-7	2-7	2-7	2-7	2-7	2-7	8	9-10	9-10
J60	Rundi	1	2-6	2-6	2-6	2-6	2-6	7,9-10	8	7,9-10	7,9-10

Table A.11: Bantu K

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
K10	Phende	1	2	3-6	3-6	3-6	3-6	7	8	9	10
K20	Mbunda	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
K30	Lunda	1	2-5	2-5	2-5	2-5	6-9	6-9	6-9	6-9	10
K40	Mbowe	1	2-4	2-4	2-4	5-9	5-9	5-9	5-9	5-9	10
K40	Mbukushu	1	2-4	2-4	2-4	5-9	5-9	5-9	5-9	5-9	10
K50	Subiya	1	2-4	2-4	2-4	5-9	5-9	5-9	5-9	5-9	10

A Groupings of numerals by noun classes in 254 BC languages

Table A.12: Bantu L

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
L20	Songye	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	10
L30	Kanyok	1	2-5	2-5	2-5	2-5	6,8	7	6,8	9	10
L30	Ciluba	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9	10
L30	Kizeela	1	2-5	2-5	2-5	2-5	6	7	8	9	10
L30	Kisanga	1	2-5	2-5	2-5	2-5	6	7	8	9	10
L50	Nkoya	1	2-4	2-4	2-4	5-9	5-9	5-9	5-9	5-9	10

Table A.13: Bantu M

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
M10	Cilungu	1	2-5	2-5	2-5	2-5	6	7-8	7-8	9	∅
M20	Malila	1	2-5	2-5	2-5	2-5	6-9	6-9	6-9	6-9	10
M20	Nyamwanga	1	2-5,8	2-5,8	2-5,8	2-5,8	6-7,9	6-7,9	2-5,8	6-7,9	10
M20	Ndali	1,10	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	1,10
M30	Nyakyusa	1,10	2-5,7	2-5,7	2-5,7	2-5,7	6=9	2-5,7	8	6=9	1,10
M40	Bemba	1	2-5	2-5	2-5	2-5	6				10
M60	Lenje	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10

Table A.14: Bantu N

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
N10	Matengo	1	2-3	2-3	4-9	4-9	4-9	4-9	4-9	4-9	10
N20	Tumbuka	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	∅
N30	Nyanja	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	∅

Table A.15: Bantu P

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
P20	Makonde	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
P20	Yao	1	2-3	2-3	4-9	4-9	4-9	4-9	4-9	4-9	10

Table A.16: Bantu R

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
R10	Nkumbi	1	2	3	4	5	6-10	6-10	6-10	6-10	6-10
R10	Nyaneka	1	2	3	4	5	6-10	6-10	6-10	6-10	6-10
R10	Umbundu	1	2	3	4	5	6-10	6-10	6-10	6-10	6-10

Table A.17: Bantu S

Group	Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
S10	Kalanga	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	∅
S30	Kgalagadi	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
S40	Xhosa	1	2-6	2-6	2-6	2-6	2-6	7-8	7-8	9-10	9-10
S60	Gitonga	1-2	1-2	3	4	5-10	5-10	5-10	5-10	5-10	5-10

Table A.18: Beboid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Bebe	1	2-5	2-5	2-5	2-5	6	7	8	9	10
Naki	1	2-5	2-5	2-5	2-5	6	7,9	8	7,9	10

Table A.19: Cross

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Bokyi	1	2-5	2-5	2-5	2-5	6	7,9	8	7,9	10
Bete-Bendi	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
Abuan	1,5-8	2-4	2-4	2-4	1,5-8	1,5-8	1,5-8	1,5-8	9	10
Odual	1,6-7	2-4	2-4	2-4	5	1,6-7	1,6-7	8	9	10
Ogbia	1,5-7	2-3,8-9	2-3,8-9	2-3,8-9	1,5-7	1,5-7	1,5-7	2-3,8-9	2-3,8-9	10
Ebughu	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Efik	1	2-8	2-8	2-8	2-8	2-8	2-8	2-8	9	10
Uda	1	2-8	2-8	2-8	2-8	2-8	2-8	2-8	9	10
Usakade	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Oro	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Elemé	1	2-3	2-3	4-6,9	4-6,9	4-6,9	7-8,10	7-8,10	4-6,9	7-8,10
Leggbo	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Mbembe	1	2-6	2-6	2-6	2-6	2-6	7-9	7-9	7-9	10
Koring	1	2-4	2-4	2-4	5	6-8	6-8	6-8	9	10
Utonkɔn	1	2-4,7-8	2-4,7-8	2-4,7-8	5	6	2-4,7-8	2-4,7-8	9	10
Kukele	1	2-4,7-8	2-4,7-8	2-4,7-8	5	6	2-4,7-8	2-4,7-8	9	10
Agwagwune	1	2-4	2-4	2-4	5-9	5-9	5-9	5-9	5-9	10
Korop	1-5,7,9	1-5,7,9	1-5,7,9	1-5,7,9	1-5,7,9	6	1-5,7,9	8	1-5,7,9	10
Icheve	1	2-3	2-3	4,8	5	6-7,9	6-7,9	4,8	6-7,9	10

A Groupings of numerals by noun classes in 254 BC languages

Table A.20: Defoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ayere	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
Igala	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
Yoruba	1	2-4,6-10	2-4,6-10	2-4,6-10	5	2-4,6-10	2-4,6-10	2-4,6-10	2-4,6-10	2-4,6-10
Ede (dial.)	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Ede (dial.)	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Ifè	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10

Table A.21: Edoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Engenni	1	2,4-5,7,10	3,6,8	2,4-5,7,10	2,4-5,7,10	3,6,8	2,4-5,7,10	3,6,8	9	2,4-5,7,10
Urhobo	1	2,5,7,9-10	3-4,6,8	3-4,6,8	2,5,7,9-10	3-4,6,8	2,5,7,9-10	3-4,6,8	2,5,7,9-10	2,5,7,9-10
Edo	1	2-4,6,8	2-4,6,8	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	5,7,9-10
Esan	1	2-4,6,8	2-4,6,8	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	5,7,9-10
Ivbie	1	2-4,6,8	2-4,6,8	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	2-4,6,8	5,7,9-10	5,7,9-10
Ghotuo	1	2-4,8	2-4,8	2-4,8	5-7,9-10	5-7,9-10	5-7,9-10	2-4,8	5-7,9-10	5-7,9-10
Isoko	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Ekajuk	1-6	1-6	1-6	1-6	1-6	1-6	7,9,10	8	7,9,10	7,9,10
Ejagham	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Nde-Ndele	1-5	1-5	1-5	1-5	1-5	6-9	6-9	6-9	6-9	10

Table A.22: Grassfields

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ghomala	1-5	1-5	1-5	1-5	1-5	6	7	8	9	10
Ngiemboon	1-3,5-6	1-3,5-6	1-3,5-6	4,8-10	1-3,5-6	1-3,5-6	7	4,8-10	4,8-10	4,8-10
Yemba	1	2-3,5	2-3,5	4,8-10	2-3,5	6	7	4,8-10	4,8-10	4,8-10
Ngomba	1-6,8-9	1-6,8-9	1-6,8-9	1-6,8-9	1-6,8-9	1-6,8-9	7	1-6,8-9	1-6,8-9	10
Bafanji	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
Mungaka	1	2-6,8	2-6,8	2-6,8	2-6,8	2-6,8	7	2-6,8	9	10
Moghamo	1-5,10	1-5,10	1-5,10	1-5,10	1-5,10	6	7	8	9	1-5,10
Mundani	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Ngie	1-8,10	1-8,10	1-8,10	1-8,10	1-8,10	1-8,10	1-8,10	1-8,10	9	1-8,10

Table A.23: Idomoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Eloyi	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
Agatu	1	2-6	2-6	2-6	2-6	2-6	7-9	7-9	7-9	10
Yala	1	2-6	2-6	2-6	2-6	2-6	7-9	7-9	7-9	10
Alago	1	2-5	2-5	2-5	2-5	6,10	7-9	7-9	7-9	6,10
Idoma	1-6	1-6	1-6	1-6	1-6	1-6	7-9	7-9	7-9	10

Table A.24: Igboid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ekpeye	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10
Igbo	1	2-4,7-8	2-4,7-8	2-4,7-8	5-6,9-10	5-6,9-10	2-4,7-8	2-4,7-8	5-6,9-10	5-6,9-10
Ikwere	1	2-4,7-8	2-4,7-8	2-4,7-8	5-6	5-6	2-4,7-8	2-4,7-8	9	10
Izi	1	2-4,7-8	2-4,7-8	2-4,7-8	5-6,10	5-6,10	2-4,7-8	2-4,7-8	9	5-6,10

Table A.25: Isimbi

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Isimbi	1	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	10

Table A.26: Jukunoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Akum	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
Kapya	1	2-5	2-5	2-5	2-5	6-9	6-9	6-9	6-9	10
Kuteb	1	2-8	2-8	2-8	2-8	2-8	2-8	2-8	2-8	10

Table A.27: Mamfe

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Denya	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Kenyang	1	2-3,6	2-3,6	4,8,9	5	2-3,6	7	4,8,9	4,8,9	10

Table A.28: Mbam

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Tuki	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Nomaande	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Tuotomb	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Yambeta	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Tunen	1-2,4-8	1-2,4-8	3	1-2,4-8	1-2,4-8	1-2,4-8	1-2,4-8	1-2,4-8	9	10
Nubaca	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Nulibie	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
Mbule	1-2	1-2	3-9	3-9	3-9	3-9	3-9	3-9	3-9	10
Numaala	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
Nugunu	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
Yangben	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10

A Groupings of numerals by noun classes in 254 BC languages

Table A.29: Mbe

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Mbe	1	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10

Table A.30: Ndemli

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ndemli	1	2-5	2-5	2-5	2-5	6	7	8	9	10

Table A.31: Nupoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ebira	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
Gbari	1	2-5,10	2-5,10	2-5,10	2-5,10	6-9	6-9	6-9	6-9	2-5,10
Kakanda	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10

Table A.32: Oko

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Oko	1	2-4,10	2-4,10	2-4,10	5,7-9	6	5,7-9	5,7-9	5,7-9	2-4,10

Table A.33: Platoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Ayu	1,10	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	1,10
Tyap	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	1-9	10
Ikulu	1-6	1-6	1-6	1-6	1-6	1-6	7	8	9	10
Lijili	1	2-5	2-5	2-5	2-5	6-7	6-7	8	9-10	9-10
Yeskwa	1-6	1-6	1-6	1-6	1-6	1-6	7-8	7-8	9	10
Eggon (dial.)	1-3,7-9	1-3,7-9	1-3,7-9	4,6	5,10	4,6	1-3,7-9	1-3,7-9	1-3,7-9	5,10
Eggon (dial.)	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10

Table A.34: Tivoid

Language	'one'	'two'	'three'	'four'	'five'	'six'	'seven'	'eight'	'nine'	'ten'
Tiv	1	2-5,7,9	2-5,7,9	2-5,7,9	2-5,7,9	6,8	2-5,7,9	6,8	2-5,7,9	10
Ipulo	1,10	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	1,10

Appendix B: Statistics of numeral groupings by noun classes in 254 BC languages

The number of languages with a numeral-specific class marker (that is different from those used with other numerals, including the zero marker) is specified under *Specific CL*. E.g. there is a specific marker for ‘one’ in 174 languages (out of the total 254). At the same time, a specific marker is rarely used for the term for ‘three’, attested in only six languages. The next row (*Distant grouping*) accounts for the cases when a numerical term is grouped by class not with the adjacent number but rather with another term that is separated from it by at least one other number. E.g. the grouping with non-adjacent numbers by class is attested for the term for ‘four’ in six of the languages under study. In one of the Eggon dialects it has the same class as the term for ‘six’ (*ù-ní* ‘4’, *ù-fín* ‘6’), whereas the rest of the numerals belong to other classes. In Icheve, the term for ‘four’ shares its class with the term for ‘eight’ (*mí-nìn* ‘4’, *mí-nùúni* ‘8’), likely because ‘eight’ derived from ‘four’ in this language. At the same time, this class is not characteristic of other numerals. A similar situation is observable in Kenyang, the only difference being that the noun class attested with ‘four’ and ‘eight’ also includes ‘nine’ (*mé-nwí* ‘4’, *mé-nèn* ‘8’, *mé-nèn nè àmòt* ‘9’ (8+1)). The group ‘4’/‘8-10’, which is distinguishable in two Grassfields languages (Yemba (Dschang) and Ngiemboon – *le-* class) belongs here as well.

The widest-attested (as well as lacking) groups for each number within a column are marked in red. For example, under ‘one’ we see that a specific noun class incompatible with other numerals is attested with the term for ‘one’ in 174 languages (out of the total 254). This is the most typical situation, e.g. a specific noun class for ‘one’ and ‘two’ incompatible with other numbers is observable in four languages only. The study of the widest-attested combinations of numbers and class markers shows that a specific class marker is often used with the BC terms for ‘one’, ‘seven’, ‘eight’, ‘nine’ and ‘ten’, whereas the terms covering the sequence from ‘two’ to ‘six’ are often grouped by class with other numbers, i.e. with each other to be precise.

B Statistics of numeral groupings by noun classes in 254 BC languages

Numerals	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'10'	SUM
Specific CL	174	12	6	7	18	36	72	65	101	151	642
Distant grouping	22	3	1	6	9	20	22	29	23	52	185
'1'-'2'	4	4									8
'1'-'3'	3	3	3								9
'1'-'4'	2	2	2	2							8
'1'-'5'	14	14	14	14	14						70
'1'-'6'	15	15	15	15	15	15					90
'1'-'7'	2	2	2	2	2	2	2				14
'1'-'8'	2	2	2	2	2	2	2	2			16
'1'-'9'	7	7	7	7	7	7	7	7	7		63
'1'-'10'	9	9	9	9	9	9	9	9	9	9	90
'2'-'3'		9	9								18
'2'-'4'		24	24	24							72
'2'-'5'		58	58	58	58						232
'2'-'6'		42	42	42	42	42					210
'2'-'7'		6	6	6	6	6	6				36
'2'-'8'		6	6	6	6	6	6	6			42
'2'-'9'		22	22	22	22	22	22	22	22		176
'2'-'10'		14	14	14	14	14	14	14	14	14	126
'3'-'4'			2	2							4
'3'-'5'			1	1	1						3
'3'-'6'			6	6	6	6					24
'3'-'7'			1	1	1	1	1				5
'3'-'8'											0
'3'-'9'			2	2	2	2	2	2	2		14
'3'-'10'											

Numerals	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'10'	SUM
Specific CL	174	12	6	7	18	36	72	65	101	151	642
Distant grouping	22	3	1	6	9	20	22	29	23	52	185
'4'-'5'				1	1						2
'4'-'6'				1	1	1					3
'4'-'7'											0
'4'-'8'				1	1	1	1	1			5
'4'-'9'				2	2	2	2	2	2		12
'4'-'10'				1	1	1	1	1	1	1	7
'5'-'6'					4	4					8
'5'-'7'					3	3	3				9
'5'-'8'					1	1	1	1			4
'5'-'9'					5	5	5	5	5		25
'5'-'10'					1	1	1	1	1	1	6
'6'-'7'						6	6				12
'6'-'8'						15	15	15			45
'6'-'9'						20	20	20	20		80
'6'-'10'						4	4	4	4	4	20
'7'-'8'							21	21			42
'7'-'9'							9	9	9		27
'7'-'10'											0
'8'-'9'								12	12		24
'8'-'10'								6	6	6	18
'9'-'10'									16	16	34
Total	254	254	254	254	254	254	254	254	254	254	2540

Appendix C: Alignments by analogy

Group	Lang.	1	2	3	4	5	1	2	3	4	5
Bantu-E	Chaga	-mwi	-vi				-wi	-vi			
Atlantic	Balant		sɪbí	yàbí				-bi	-bi		
Bantoid	Bute			tareb	nasib				-b	-b	
Adamawa	Kolbila				nereb	nunub				-b	-b
Kordofanian-Orig	Orig				arum	wuram				-m	-m
Bantoid	Mmen		bege	tege				-ege	-ege		
Mande	Busa			*a-hō	si-hō			-hō	-hō	-hō	
Atlantic	Bayot		i-rigəʔ	i-fiigiʔ	i-βeiʔ	ɔ-ɾɔʔ		-ʔ	-ʔ	-ʔ	-ʔ
Atlantic	Sereer		fik	tadik	nahik	βetik		-ik	-ik	-ik	-ik
Atlantic	Nyun Gubëeher	-nduk	-naak		-rendek		-k	-k		-k	
Atlantic	Palor		ka-nak	ke-jek				-k	-k		
Adamawa	Gimme		idtige	tage	nage	nonige		-ge	-ge	-ge	-ge
Adamawa	Vere		ituko	tariko	nariko			-ko	-ko	-ko	
Gur	Nawdm		mrek	mtak				-k	-k		
Gur	Dogose		i-yok	i-sak	i-yɪk	i-wak		-k	-k	-k	-k
Gur	Khisa		ɲɔʔ	sâaʔ	ɲéèʔ	ɲwââʔ		-ʔ	-ʔ	-ʔ	-ʔ
Kordofanian-Talodi	Tocho	puluk	we-rak	wa-tak			-k	-k	-k		
Kordofanian-Talodi	Jomang	y-illik	y-ilr,ak	y-idak			-k	-k	-k		
Kordofanian-Talodi	Nding			t-atak	-ibipik				-k	-k	
Kordofanian-Talodi	Tegem		paderig	padaig				-ig	-ig		
Kordofanian-Katla	Katla	te:ták	sek				-k	-k			
Bantoid	Mama			taru	la jinu	tonu			-u	-u	-u
Mande	Soninke		filo	siko	(i-)nakato	karago		-o	-o	-o	-o
Adamawa	Peere		iro	taro	naro	nuno		-o	-o	-o	-o
Ubangi	Ndogo		so	tao	nao	vo		-o	-o	-o	-o
Ubangi	Pambia		a-vai	wa-tai	(h)avai	boinyaci		-i	-i	-i	-i
Bantoid	Tiv		har	-tar				-ar	-ar		
Bantoid	Kila			tar	nar				-ar	-ar	
Atlantic	Fogny			si-fegir	si-bakir				-ir	-ir	
Atlantic	Mlomp	yɔ-nɔɔl	si-subel	si-hejil	si-bacil		-l	-l	-l	-l	
Atlantic	Kasa			si-heji	si-baki				-l	-l	
Atlantic	Pepel		ɲ-pugus/-t	ɲ-jes/-t				-s/-t	-s/-t		
Atlantic	Sua	sɔn	m-cen		m-nan	sugun	-n	-n		-n	-n
Bantoid ?	Chamba		bara	te-ra-				-ra	-ra		
Adamawa	Kolbila		inu	tonu				-nu	-nu		

Group	Lang.	1	2	3	4	5	1	2	3	4	5
Adamawa	Yendang		ini	tat	nat	ghi-nan			-at	-at	
Adamawa	Mom Jango	muzoz	itez	taz	naz				-az	-az	
Ubangi	*Gbaya			*tar(a)	*nar(a)	*mor			-r	-r	-r
Kordofanian-Heiban	Rere		kur,an	tor,ol	kor,ogan			-r	-r	-r	
Atlantic	Proto-Cangin	*ji- no?	*ka-nak				n-	n-			
Kordofanian-Katla	Tima		ehek	ehoat	ehalam			h-	h-	h-	
Atlantic	Wolof		ñaar	ñett	ñeent			ñ-	ñ-	ñ-	
Mande	Samo			so	si	soro			s-	s-	s-
Kru	Gbe, Bassa				hyi-, hiye	hm				h-	h-
Kwa	Proto-Potou-Tano				na	nu				n-	n-
Adamawa	Proto-Adamawa				na	nu				n-	n-
Gur	Proto-Gur				*na	*nu				n-	n-
Dogon	Proto-Dogon				*na-	*no				n-	n-
Bantu-J	Ha	mbele	-bhili				-BILI	-BILI			
Gur	Mbelime	yĕnde	yede				yEde	yEde			

Appendix D: Numerals for ‘1’ in the Cross languages

Sources	Group	Branch	Language	‘1’
Koelle 1963[1854]	1. Bendi		Alege	úbo·
Ronald Stanford (Chan)	1. Bendi		Bekwarra	kin
Kierien Ekpong Ayugha (Chan)	1. Bendi		Bokyi	kíboŋè
Koelle 1963[1854]	1. Bendi		Nki	kebóŋe
Kierien Ekpong Ayugha (Chan)	1. Bendi		Bete-Bendi	ikèn
G.U. Utam (Chan)	1. Bendi		Bete-Bendi	iken
Dimmendaal 1978	2. Delta-Cross	Upper	Agoi	gni
Dimmendaal 1978	2. Delta-Cross	Upper	Ikom	ŋ ^w ɔ-é
Alexander Ubi Iwara (Chan)	2. Delta-Cross	Upper	Lokaa	wána
Imelda Udoh (Chan)	2. Delta-Cross	Upper	Leggbo	wòni
Katharine Barnwell (Chan)	2. Delta-Cross	Upper	Mbembe	wànó
Dimmendaal 1978	2. Delta-Cross	Upper	Mbembe	wā-ní
Koelle 1963[1854]	2. Delta-Cross	Upper	Okam (Okom?)	wóno
Mary Umeozor (Chan)	2. Delta-Cross	Upper	Utɔnkɔn	g ^w ã
Philip N. Anagbogu (Chan)	2. Delta-Cross	Upper	Koring	gúŋ
Sixtus O. Obuk (Chan)	2. Delta-Cross	Upper	Kukele	vɔn
Dimmendaal 1978	2. Delta-Cross	Upper	KoHumono	g ^w éñ
Kay Williamson & Ethelbert Kari (Chan)	2. Delta-Cross	Upper	Agwagwune	dʒéŋ
Koelle 1963[1854]	2. Delta-Cross	Upper	Agwagwune	koŋ
Dimmendaal 1978	2. Delta-Cross	Upper	Kioŋ	bú-níí
Connell 1991	2. Delta-Cross	Upper	Korop	bú-ní
Benita Uzoigwe & Evelyn Mbah (Chan)	2. Delta-Cross	Upper	Icheve	àmóó
Connell 1991	2. Delta-Cross	Upper	PROTO-UPPER	*g ^w á-nì

D Numerals for '1' in the Cross languages

Sources	Group	Branch	Language	'1'
Dimmendaal 1978	2. Delta-Cross	Upper	PROTO-UPPER	*g ^w á-nì
Ian Gardne (Chan)	2. Delta-Cross	Central	Abuan	òníin
Ethelbert E. Kari (Chan)	2. Delta-Cross	Central	Odual	opiín
Ethelbert E. Kari (Chan)	2. Delta-Cross	Central	Ogbia	onin
Kari 2000	2. Delta-Cross	Central	Ogbronuagum	òní'ní
Connell 1991	2. Delta-Cross	Lower	Ebughu	sìŋ
Connell 1991	2. Delta-Cross	Lower	Efai	sìŋ
Ito Michael (Chan)	2. Delta-Cross	Lower	Anaang	keèd
Connell 1991	2. Delta-Cross	Lower	Anaang	kèt
Koelle 1963[1854]	2. Delta-Cross	Lower	Anaang	keet
Eyo Mensah (Chan)	2. Delta-Cross	Lower	Efik	kiét
Connell 1991	2. Delta-Cross	Lower	Efik	kièt, tièt
Connell 1991	2. Delta-Cross	Lower	Ekit	kiàŋ
Connell 1991	2. Delta-Cross	Lower	Etebi	kiàŋ
Márcia Santos Duarte de Oliveira (Chan)	2. Delta-Cross	Lower	Ibibio	keèd
Connell 1991	2. Delta-Cross	Lower	Ibibio	keèd
Urua et al. 2004	2. Delta-Cross	Lower	Ibibio	keèt
Connell 1991	2. Delta-Cross	Lower	Ukwa	kièt
Connell 1991	2. Delta-Cross	Lower	Ukwa	kièt
Connell 1991	2. Delta-Cross	Lower	Uda	sìn
Connell 1991	2. Delta-Cross	Lower	Ibino	tfì
Connell 1991	2. Delta-Cross	Lower	Ibuoro	kièt
Connell 1991	2. Delta-Cross	Lower	Itu Mbuso	kèn
Connell 1991	2. Delta-Cross	Lower	Ilue	ki
Connell 1991	2. Delta-Cross	Lower	Okobo	kiòŋ
Connell 1991	2. Delta-Cross	Lower	Enwang	sìŋ
Connell 1991	2. Delta-Cross	Lower	Usakade	tfèn
E.N. Enene (Chan)	2. Delta-Cross	Lower	Obolo	gê
Connell 1991	2. Delta-Cross	Lower	Obolo	gê
Rowland Oke 2003	2. Delta-Cross	Lower	Obolo	gê
Golden Ekpo (Chan)	2. Delta-Cross	Lower	Oro	ki
Connell 1991	2. Delta-Cross	Lower	Oro	ki
Connell 1991	2. Delta-Cross	Lower	Iko	ki
Connell 1991	2. Delta-Cross	Lower	PROTO-LOWER	*cèèd
Michael A. Nicol (Chan)	2. Delta-Cross	Ogoni	Gokana	ẽnẽ
Brosnahan 1967	2. Delta-Cross	Ogoni	Gokana	ènẽ
Michael A. Nicol (Chan)	2. Delta-Cross	Ogoni	Khana	zĩĩ
Charles Tessaro (Chan)	2. Delta-Cross	Ogoni	Eleme	n̄n̄e

Appendix E: The main sources for the 1000 NC languages cited

The NC languages and their main sources are organized by family. Within the Benue-Congo family they are then organized by groups, and within Bantu they are organized by zones. The second column lists the main bibliographical sources. The third column indicates the names of the contributors in Chan's database [Chan]. A semicolon separates each source.

Table E.1: BC: Bantoid

Language	Sources	Contributors for Chan (1998-2018)
Abon	BCCW	
Ajumbu		Nelson Tschonghongi
Bankala	Kraft 1981; Maddieson & Williamson 1975	
Bebe		Grace Tabah
Befang		Nelson Tschonghongi
Bute	ZOMPIST	
Chamba	ZOMPIST	
Chamba-Daka		Raymond Boyd
Denya		Lawrence Marc Seguin
Dumbo	ZOMPIST	
Ejagham		John Watters
Ekajuk	Crabb 1965; BCCW	John Awam
Ekoi	ZOMPIST	
Elip		Ginger Boyd
Esimbi	Anonymous-Esimbi	Brad Koenig; Cristin Kalinowski

E The main sources for the 1000 NC languages cited

Language	Sources	Contributors for Chan (1998-2018)
Fam	Blench n.d.	
Fio		Nelson Tschonghonge
Gwa	Greenberg 1966	
Ipulo		Anna Galland
Jarawa	BCCW; Koelle 1963[1854]; Maddieson & Williamson 1975	Charles Kraft
Jiru	ZOMPIST	
Kenyang	BCCW	Tanyi Eyong Mbuagbaw
Kila	ZOMPIST	
Kulung	BCCW; Maddieson & Williamson 1975	
Lyive		Suzie Foster
Mama	BCCW; Maddieson & Williamson 1975	
Mambila		Mona Perrin
Mbe	BCCW	James N. Pohlig
Mboa	BCCW; Maddieson & Williamson 1975	
Mbula-Bwazza	BCCW; Maddieson & Williamson 1975	Wolf and Hildegard Seiler
Mbule		Ginger Boyd
Naki		Nelson Tschonghonge
Nchane		Rich; Katrina Boutwell
Ndemli		Ginger Boyd
Nde-Ndele	BCCW	Osbert Asinya
Ndoe	Crabb 1965; BCCW	
Nkem	Crabb 1965; BCCW	
Nkem- Nkum	Crabb 1965; BCCW	Ita Akuku S.; Kathie Watters
Nomaande		Patricia Wilkendorf
Nubaca		Ginger Boyd
Nugunu		Keith Patman
Nulibie	Ekambi 1990	
Numaala		Ginger Boyd
Suga		Bjørghild Kjelsvik
Tiba	Boyd 1999	

Language	Sources	Contributors for Chan (1998-2018)
Tikar		Ellen Jackson
Tiv		Terhema T. Tsee; Uwe Seibert
Tuki		Jacquis Kongne Welaze
Tunen		Jacquis Kongne Welaze
Tuotomb		Ginger Boyd
Twendi		Bruce Connell
Vute		Rhonda Thwing; Gladys Guarisma
Yambeta		Bolioki Léonard-Albert
Yangben		Ginger Boyd

Table E.2: BC: Bantoid: Bantu, A

Zone	Language	Sources	Contributors for Chan (1998-2018)
A10	Akoose		Robert Hedinger
A10	Bafo	ZOMPIST	
A10	Bakaka		Ewane Etame Jean
A10	Bonkeng	ZOMPIST	
A10	Lundu	ZOMPIST	
A10	Oroko	BCCW	Dan Friesen
A11	Balong	ZOMPIST	
A20	Duala		Francine Ebegne Ndedi
A30	Batanga		Emmanuel Ngue Um
A30	Benga	Van der Veen 2011	Scott Smith
A30	Bubi	ZOMPIST	
A40	Bakoko		Njack Mathaus
A40	Bankon	BCCW	Rachele Delucchi
A40	Barombi		Gratien Gualbert Atindogbe
A40	Lombi	ZOMPIST	

E The main sources for the 1000 NC languages cited

Zone	Language	Sources	Contributors for Chan (1998-2018)
A50	Bafia		Gladys Guarisma
A50	Kpa	ZOMPIST	
A70	Bebil		Ginger Boyd
A70	Ewondo		André Jacquot
A70	Fang	Van der Veen 2011	André Jacquot
A70	Mengisa		Messina Ethé Julia
A80	Bekwil	Van der Veen 2011	John Philips
A80	Bomwali		John Philips
A80	Byep		Ginger Boyd
A80	Gyele		Nadine Grimm; Emmanuel Ngue Um
A80	Kol	Henson 2007	Teresa Heath
A80	Koonzime	Beavon & Beavon 1996	Keith Beavon
A80	Mpumpong		David Thormoset
A80	Ngumba		Daniel Duke
A80	So	ZOMPIST	
A90	Kako	Ernst 1992	Urs Ernst
A90	Kwakum	Belliard 2005	Ginger Boyd

Table E.3: BC: Bantoid: Bantu, B

Zone	Language	Sources	Contributors for Chan (1998-2018)
B10	Enenga	Van der Veen 2011	
B10	Galwa	Van der Veen 2011	
B10	Myene		Odette Ambouroué; André Jacquot
B10	Orungu	Van der Veen 2011	
B20	Kele	Van der Veen 2011	Soraya Mokrani; André Jacquot
B20	Kélé	ZOMPIST	
B20	Kota		Soraya Mokrani; André Jacquot
B20	Mbangwe		André Jacquot
B20	Mwesa	Medjo Mvé 2014b; Van der Veen 2011	Soraya Mokrani
B20	Ndambomo	Medjo Mvé 2014a; Van der Veen 2011	
B20	Ntumbede		Soraya Mokrani
B20	Sake	Van der Veen 2011	Soraya Mokrani; André Jacquot
B20	Wumbvu	Van der Veen 2011	Soraya Mokrani; Jean A. Blanchon
B30	Kande	Grollemund 2006b	
B30	Pinji	Grollemund 2006a; Van der Veen 2011	André Jacquot
B30	Vove	Van der Veen 2011	
B40	Barama		Jean A. Blanchon
B40	Lumbu	Van der Veen 2011	Paul Achille Mavoungou
B40	Punu	Van der Veen 2011	Jean A. Blanchon
B40	Sangu	Van der Veen 2011; Nurse & Philippsen 1975/1999	Jean A. Blanchon
B40	Sira	Van der Veen 2011	Jean A. Blanchon

E The main sources for the 1000 NC languages cited

Zone	Language	Sources	Contributors for Chan (1998-2018)
B60	Mbere		André Jacquot
B60	Ngul		Jacques Nkiene
B70	Ngungwel		Ruth Rahary; André Jacquot
B70	Teke-Nzikou	Van der Veen 2011	Ruth Rahary
B70	Teke-Tege	Van der Veen 2011; Koni Muluwa & Bostoën 2015	Louise Fontaney; Guy Noël Kouarata
B70	Teke-Tyee	Van der Veen 2011	Ruth Rahary
B80	Mbuun	Koni Muluwa & Bostoën 2015	Joseph Koni Muluwa
B80	Mpiin	Koni Muluwa & Bostoën 2015	Joseph Koni Muluwa
B80	Mpur	Koni Muluwa & Bostoën 2015	
B80	Nsong	Koni Muluwa & Bostoën 2015	Joseph Koni Muluwa
B80	Nzadi	Crane et al. 2011; Koni Muluwa & Bostoën 2015	Larry H. Hyman
B80	Songo	Nurse & Philippson 1975/1999	Jacques Nkiene
B80	Tiene		Jacques Nkiene
B80	Yansi	Koni Muluwa & Bostoën 2015; Burssens 1994	

Table E.4: BC: Bantoid: Bantu, C

Zone	Language	Sources	Contributors for Chan (1998-2018)
C10	Yaka		Dominique Kosseke; François Ndinga
C20	Bongili		John Philips
C30	Koyo		André Jacquot
C30	Mbosi	Van der Veen 2011	Louise Fontaney
C40	Bamwe		Jean-Pierre Donzo
C40	Bangala		Stephen T. M. Lukusa
C40	Bolondo	Donzo Bunza 2015	Jean-Pierre Donzo
C40	Budza	Motingea Mangulu 1996	Jacques Nkiene
C40	Lingala		Stephen T. M. Lukusa
C40	Lobala		David Morgan
C40	Sakata		Jacques Nkiene
C40	Sengele		Jacques Nkiene
C50	Likile	Carrington 1977	
C50	Ngombe	Donzo Bunza 2015	André Motingea Mangulu
C50	Pagibete	Donzo Bunza 2015	Nzongo Roger
C70	Kela	ZOMPIST	
C70	Kusu	ZOMPIST	
C70	Mongo-Nkundu		Jacques Nkiene
C70	Ombo	ZOMPIST	
C80	Tetela		Jacques Nkiene; Claire Grégoire
C90	Bushong	Vansina 1959	Jacques Nkiene
C90	Ndengese		Jacques Nkiene

E The main sources for the 1000 NC languages cited

Table E.5: BC: Bantoid: Bantu, D

Zone	Language	Sources	Contributors for Chan (1998-2018)
D10	Enya	ZOMPIST	
D10	Lengola		Maryanne Augustin
D20	Bali (Kibali)	Blench et al. 2009	Maryanne Augustin
D20	Holoholo	Coupez 1955	
D20	Lika		Douglas W. Boone
D20	Lega	Botne & Salama-Gray 1994	Robert Botne; Jacques Nkiene; Maryanne Augustin
D20	Zimba		Maryanne Augustin; Constance Kutsch Lojenga
D30	Bhele		Tim Raymond
D30	Budu		Loren Koehler
D30	Komo		Paul Thomas
D30	Nyali		Nlandu Mukoko Mpanzu; B. Bukas-Yakabuul

Table E.6: BC: Bantoid: Bantu, E

Zone	Language	Sources	Contributors for Chan (1998-2018)
E10	Ikoma		Oliver Rundell
E10	Kabwa		Johnny Walker
E10	Ngoreme	Nurse & Philippson 1975/1999	Holly Higgins
E10	Sizaki	Nurse & Philippson 1975/1999	Michelle Smith; Holly Higgins
E10	Suba	Nurse & Philippson 1975/1999	Naphtaly Mattah
E10	Zanaki	Nurse & Philippson 1975/1999	Hazel Gray

Zone	Language	Sources	Contributors for Chan (1998-2018)
E20	Chuka	Nurse & Philippson 1975/1999	Aaron Mbae Muga
E20	Embu	Nurse & Philippson 1975/1999	Christa Kendall
E20	Gikuyu		Martin Njoroge; Elizabeth Kiarie
E20	Kamba	Nurse & Philippson 1975/1999	Angelina Nduku Kioko
E20	Meru	Nurse & Philippson 1975/1999	John Kobia Ataya
E30	Gweno	Nurse & Philippson 1975/1999	George Mrikaria
E30	Machame	Nurse & Philippson 1975/1999	Anonymous
E30	Mochi	Nurse & Philippson 1975/1999	George Mrikaria
E30	Rwa		Daisuke Shinagawa
E30	Vunjo	Nurse & Philippson 1975/1999	Anonymous
E40	Digo		Steve Nicolle
E40	Pokomo		Jon Hampshire
E45	Nata	Nurse & Philippson 1975/1999	Joash G. Johannes
E50	Kikamba	ZOMPIST	
E50	Kikuyu	Nurse & Philippson 1975/1999	
E60	Chaga	ZOMPIST	
E60	Kahe	Nurse & Philippson 1975/1999	
E60	Mashami		Anonymous
E60	Rombo	Montlahuc 2000	
E70	Taita	ZOMPIST	
E70	Tubeta	Nurse & Philippson 1975/1999	

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Table E.7: BC: Bantoid: Bantu, F

Zone	Language	Sources	Contributors for Chan (1998-2018)
F10	Bende	Nurse & Philippson 1975/1999	Oliver Stegen; Yuko Abe
F10	Fipa	Nurse & Philippson 1975/1999	Anonymous
F10	Gongwe		Yuko Abe
F10	Mambwe	Nurse & Philippson 1975/1999	Lee S. Bickmore
F10	Pimbwe	Nurse & Philippson 1975/1999	Oliver Stegen
F10	Rwila		Yuko Abe
F20	Bungu	Nurse & Philippson 1975/1999	
F20	Kimbu	Nurse & Philippson 1975/1999	
F20	Konongo		Anonymous
F20	Nyamwezi	Maganga & Schadeberg 1992; Nurse & Philippson 1975/1999	Anonymous
F20	Sukuma	Nurse & Philippson 1975/1999	Herman M. Batibo
F20	Sumbwa	Nurse & Philippson 1975/1999	
F30	Mbugwe		Vera Wilhelmsen
F30	Nilamba	Nurse & Philippson 1975/1999	Anonymous
F30	Nyaturu	Nurse & Philippson 1975/1999	Anonymous
F30	Rangi		Oliver Stegen; Margaret Dunham

Table E.8: BC: Bantoid: Bantu, G

Zone	Language	Sources	Contributors for Chan (1998-2018)
G10	Gogo		Anonymous
G20	Asu		Anonymous
G20	Bondei	Nurse & Philippson 1975/1999	Anonymous
G20	Mbugu	ZOMPIST	
G20	Shambala		Justin Willis
G30	Kami	Nurse & Philippson 1975/1999	
G30	Kutu	Nurse & Philippson 1975/1999	Malin Petzell
G30	Luguru	Nurse & Philippson 1975/1999	Malin Petzell
G30	Mushunguli		David Odden
G30	Ngulu	Nurse & Philippson 1975/1999	Malin Petzell
G30	Zigula	Nurse & Philippson 1975/1999	Malin Petzell; Justin Willis
G40	Komoro	ZOMPIST	
G40	Pemba	ZOMPIST	
G40	Swahili		Stephen T. M. Lukusa
G40	Tikuu	ZOMPIST	
G50	Ndamba	Nurse & Philippson 1975/1999	Peter Edelsten
G50	Pogoro	Nurse & Philippson 1975/1999	
G60	Bena	Nurse & Philippson 1975/1999	Michelle Morrison
G60	Hehe	Nurse & Philippson 1975/1999	Anonymous
G60	Pangwa	Nurse & Philippson 1975/1999	Anonymous

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Table E.9: BC: Bantoid: Bantu, H

Zone	Language	Sources	Contributors for Chan (1998-2018)
H10	Kikongo	Koni Muluwa & Bostoan 2015	
H10	Koongo		Emilio Bonvini; Stephen T. M. Lukusa
H10	Yombe	de Grauwe 2009	Jean A. Blanchon
H30	Ngongo	Koni Muluwa & Bostoan 2015	Jacques Nkiene

Table E.10: BC: Bantoid: Bantu, J

Zone	Language	Sources	Contributors for Chan (1998-2018)
J10	Chiga		Richard Nzogi
J10	Ganda	Nurse & Philippson 1975/1999	Francis Katamba
J10	Gundu		Martin Diprose
J10	Gwere	Nurse & Philippson 1975/1999	Richard Nzogi
J10	Hema		Nlandu Mukoko Mpanzu
J10	Nyankole	Nurse & Philippson 1975/1999	Richard Nzogi; Justin Willis
J10	Nyoro	Nurse & Philippson 1975/1999	Richard Nzogi
J20	Haya	Byarushengo et al. 1977; Nurse & Philippson 1975/1999	Henry RT Muzale
J20	Kara		Anonymous
J20	Kwaya	Nurse & Philippson 1975/1999	Tim Roth; Holly Higgins
J20	Nyambo	Nurse & Philippson 1975/1999	Josephat Rugemalira

Zone	Language	Sources	Contributors for Chan (1998-2018)
J30	Bukusu		Aggrey Wasike
J30	Idakho		Christa Kendall
J30	Logooli	Nurse & Philippson 1975/1999	Christa Kendall
J30	Luyia		Aurah Violet; Geoffrey Wafula
J30	Masaba	Nurse & Philippson 1975/1999	Richard Nzogi
J30	Nyole		Aristarchus Gesa
J30	Nyore		Christa Kendall
J40	Nande		Ngessimo M. Mutaka
J50	Fuliiru		Roger Van Otterloo
J50	Shi		Yvonne Bastin
J60	Ha	Nurse & Philippson 1975/1999	Lotta Auni
J60	Rundi	Nurse & Philippson 1975/1999	Jean Ntakirutimana
J60	Rwanda	Nurse & Philippson 1975/1999	Jean de Dieu Karangwa
JD40	Konzo	ZOMPIST	
JD50	Hunde	ZOMPIST	
JD50	Tembo		Steve Nicolle
JD60	Vinza	Nurse & Philippson 1975/1999	
JE10	Lubwisi	Musinguzi et al. 2012	
JE10	Luganda	ZOMPIST	
JE10	Lulamoji	Larry Hyman pc	
JE10	Nkore-Kiga	Taylor 1955	
JE10	Soga	Nurse & Philippson 1975/1999	Richard Nzogi
JE20	Jita	Nurse & Philippson 1975/1999	Oliver Rundell
JE30	Luhya	Nurse & Philippson 1975/1999	
JE40	Gusii	Nurse & Philippson 1975/1999	
JE40	Simbiti		Johnny Walker

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Table E.11: BC: Bantoid: Bantu, K

Zone	Language	Sources	Contributors for Chan (1998-2018)
K10	Mbwela	ZOMPIST	
K10	Nyengo	ZOMPIST	
K10	Phende	Koni Muluwa & Bostoën 2015	Jacques Nkiene; Nlandu Mukoko Mpanzu; B. Bukas Yakabuul
K20	Mbunda		Ernst Wendland
K20	Nyemba		Zavoni Ntondo
K30	Lunda		Boniface Kawasha
K40	Mbowe		Nancy C. Kula
K40	Mbukushu		Robert Munganda
K40	Mwenyi		Nancy C. Kula
K50	Subiya		Ndana Ndana; Rolf Theil
K60	Mbala	Koni Muluwa & Bostoën 2015	Jacques Nkiene

Table E.12: BC: Bantoid: Bantu, L

L20	Kete	Kamba-Muzenga 1980	
L20	Songye		Nlandu Mukoko Mpanzu; B. Bukas-Yakabuul
L30	Ciluba	Stephen T. M. Lukusa; Nlandu Mukoko Mpanzu and B. Bukas Yakabuul	
L30	Kanyok	Mukash Kalel; Nlandu Mukoko Mpanzu; B. Bukas Yakabuul	
L30	Kisanga	ZOMPIST	
L30	Kizeela		Anneleen Van der Veken; C. T. Kabange Mukala
L30	Luba-Katanga		Nlandu Mukoko Mpanzu; B. Bukas Yakabuul
L50	Nkoya		Ernst Wendland
L60	Mbweru	ZOMPIST	

Table E.13: BC: Bantoid: Bantu, M

M10	Cilungu	Kagaya 1987	
M10	Rungu	Nurse & Philippson 1975/1999	
M20	Malila	Nurse & Philippson 1975/1999	Helen Eaton
M20	Ndali	Nurse & Philippson 1975/1999	Jean Chavula; Al Mtenje
M20	Nyamwanga		Lee S. Bickmore
M30	Nyakyusa	Nurse & Philippson 1975/1999	Melanie Reimer
M40	Bemba		Alex Makasa Kasonde
M60	Lenje		Ernst Wendland

Table E.14: BC: Bantoid: Bantu, N

N10	Matengo	Nurse & Philippson 1975/1999	Yoneda Nobuko
N10	Mpoto	Nurse & Philippson 1975/1999	
N11	Manda	Nurse & Philippson 1975/1999	Hazel Gray
N20	Tumbuka		Jean Chavula and Al Mtenje
N30	Nyanja		Mubanga E. Kashoki

Table E.15: BC: Bantoid: Bantu, P

P10	Matuumbi	Nurse & Philippson 1975/1999	
P10	Ngindo	Nurse & Philippson 1975/1999	
P20	Makonde	Manus 2003; Nurse & Philippson 1975/1999	Benjie Leach
P20	Yao	Nurse & Philippson 1975/1999	Julius Taji; Armindo Atelela Ngunga

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Table E.16: BC: Bantoid: Bantu, R

R10	Khumbi		Riikka Halme
R10	Nkumbi		Riikka Halme
R10	Nyaneka		Riikka Halme
R10	Umbundu		Riikka Halme
R30	Herero		Jekura U. Kavari; Ferdie Weich
R40	Yeyi		Lydia Nyati-Ramohobo

Table E.17: BC: Bantoid: Bantu, S

S10	Kalanga		Andy Chebanne
S20	Ronga	ZOMPIST	
S20	Venda		James Mafela
S30	Kgalagadi		Kemmonye C. Monaka
S30	Lozi		Mildred Wakumelo
S30	Sesotho	ZOMPIST	
S40	Swazi		P.C. Taljaard
S40	Xhosa		Tessa Dowling; Loyiso Mletshe
S60	Gitonga		Jose Henriques

Table E.18: BC: Bantoid Grassfields

Language	Sources	Contributors for Chan (1998-2018)
Bafanji		Cameron Hamm
Bafut	BCCW	Pius N. Tamanji; Joseph Mfonyam
Bamileke	Kropp Dakubu 1977	
Bamun	BCCW	Abdoulaye Laziz Nchare
Fefe	BCCW	Djomeni Gabriel; Domché Teko Engelbert
Ghomala	BCCW	Domché Teko Engelbert
Kom	Hyman 1995; BCCW	Domché Teko Engelbert ; Nain Yem Victorine
Laimbue		Pius W. Akumbu
Limbang	Fransen 1995	Francis Wepnong; Virginia Bradley
Medumba	BCCW	Katie Franich; Domché Teko Engelbert
Mmen	Hyman 1995	Lena Björkestedt
Moghamo	Mbah 2013	
Mundani		Mary Annett
Mungaka	BCCW; Koelle	Cameron Hamm
Ngemba	Koelle 1963[1854]	Nchang Divine Ndimofor; Evelyn Fogwe Chibaka
Ngie		Eugene Ayongaba; Domché Teko Engelbert; Florence Umenjoh
Ngiemboon		Stephen Anderson; Etienne Lonfo
Ngomba	BCCW	Scott Alan Satre
Ngwe	BCCW	Jesse Lovegren
Ring	Hyman & Jisa 1979	
Yemba	Bird & Tadadjeu 1997; BCCW	Domché Teko Engelbert

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Table E.19: BC: Cross

Language	Sources	Contributors for Chan (1998-2018)
Abua		Ian Gardner
Abuan	Gardner 1980; Wolff 1969	
Agoi	Dimmendaal 1978	
Agwagwune	Dimmendaal 1978	Kay Williamson; Ethelbert E. Kari
Alege	BCCW; Koelle 1963[1854]	
Anaang	Connell 1991; BCCW	Ito Michael
Bekwarra	BCCW	Ronald Stanford
Bendi	Blench 2001; ZOMPIST	
Bete-Bendi	BCCW	Kierien Ekpong Ayugha; G.U. Utam
Bokyi	BCCW	Kierien Ekpong Ayugha
Ebughu	Connell 1991	Bruce Connell
Efai	Connell 1991	Bruce Connell
Efik	Connell 1991; BCCW	Eyo Mensah
Ekit	Connell 1991	
Eleme		Charles Tessaro
Enwang	Connell 1991	
Etebi	Connell 1991	
Gokana	Brosnahan 1967; Dimmendaal 1978; BCCW	Michael A. Nicol
Ibibio	Urua et al. 2004; Connell 1991	Márcia Santos Duarte de Oliveira
Ibino	Connell 1991	
Ibuoro	Connell 1991	
Icheve		Benita Uzoigwe; Evelyn Mbah
Iko	Connell 1991	

Language	Sources	Contributors for Chan (1998-2018)
Ikom	Dimmendaal 1978; BCCW	
Ilue	Connell 1991	
Itu	Connell 1991	
Khana		Michael A. Nicol
Kiɔŋ	ZOMPIST	
Kiong	Dimmendaal 1978; BCCW	
Kohumono	Dimmendaal 1978; BCCW	
Koring	Dimmendaal 1978	Philip N. Anagbogu
Korop	Dimmendaal 1978	Bruce Connell
Kugbo	Blench 2008; ZOMPIST	
Kukele	Dimmendaal 1978; BCCW	Sixtus O. Obuk
Leggbo	Dimmendaal 1978; BCCW	Imelda Udoh
Lokaa	Dimmendaal 1978; BCCW	Alexander Ubi Iwara
Mbembe	Dimmendaal 1978; BCCW	Katharine Barnwell
Nki	Koelle 1963[1854]	
Obolo	Rowland Oke 2003; Connell 1991; BCCW	E.N. Enene
Odual	Blench 2008	Ethelbert E. Kari
Ogbia		Ethelbert E. Kari
Ogbronuagum	Kari 2000; Blench 2008	Ethelbert E. Kari
Ogoni	Rongier 2003; Brosnahan 1967	
Okam	Koelle 1963[1854]	
Okobo	Connell 1991	
Olulumo	Dimmendaal 1978; BCCW	
Oro	Connell 1991	Golden Ekpo
Uda	Connell 1991	Bruce Connell
Ufia	BCCW; ZOMPIST	
Ukwa	Connell 1991	Bruce Connell,
Usakade	Connell 1991	Bruce Connell
Utɔnkɔn		Mary Umeozor

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Table E.20: BC: Defoid

Language	Sources	Contributors for Chan (1998-2018)
Aku	ZOMPIST; Koelle 1963[1854]	
Arigidi		Gajuwa Talabi
Ayere		Anja Choon
Degema		Ethelbert E. Kari
Ede		Hounkpati Capo; Awe C. Vincent; Jenny Rowe; Koba Evariste
Edo		Esohe Omoreghe; Ronald P. Schaefer
Engenni		Elaine Thomas
Esan		Evarista Ofuije Osiruemu
Ghotuo		Ben Elugbe
Ifè	Koelle 1963[1854]	Jenny Rowe
Igala		Salem Ochala Ejeba
Isoko		Shirley Yul-Ifode
Ivbie		Ikhanoba Maxwell Thickman; Wolf Seiler; James Akoson
Okpamheri		Francis Osadolo; Uwe Seibert
Urhobo		Rose Aziza
Yoruba	Sachnine 1997; Fresco 1970	Ethelbert E. Kari

Table E.21: BC: Edoid

Language	Sources	Contributors for Chan (1998-2018)
Oloma	Elugbe 1987	
Ukue	Elugbe 1987	

Table E.22: BC: Idomoid

Language	Sources	Contributors for Chan (1998-2018)
Agatu		Yakubu Jacob Umar
Alago		Daniel Gya
Eloyi	Mackay 1964; BCCW	Yohanna Danladi; A. U. Okwudishu
Etulo		Benjamin I. Mmadike
Gade	ZOMPIST	
Idoma		Clara Ikekeonwu
Yala	Koelle 1963[1854]	Kola Adeniyi

Table E.23: BC: Igboid

Language	Sources	Contributors for Chan (1998-2018)
Ábād̄ṣa	Koelle 1963[1854]	
Aro	Koelle 1963[1854]	
Ekpeye		David Clark
Igbo		Ozo-mekuri Ndimele; Ethelbert E. Kari
Ikwere		Sylvester Osu
Íṣièle	Koelle 1963[1854]	
Ìsòáma	Koelle 1963[1854]	
Izi		Reinier de Blois
Mbófia	Koelle 1963[1854]	

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Table E.24: BC: Kainji, Platoid

Language	Sources	Contributors for Chan (1998-2018)
Kainji		
Amo	BCCW; ZOMPIST	
Basa	Koelle 1963[1854]	Philip M. Imoh
Buji	BCCW; ZOMPIST	
Bunu	Dettweiler, Dettweiler & Dettweiler 1993; BCCW	
Cawai	ZOMPIST	
Cinda	BCCW	Gareth and Katherine Mort
Darangi	Dettweiler, Dettweiler & Dettweiler 1993	
Duka	Dettweiler, Dettweiler & Dettweiler 1993	
Dukku	Dettweiler, Dettweiler & Dettweiler 1993	
Fungwa	BCCW	
Giro	Dettweiler, Dettweiler & Dettweiler 1993	
Gure	ZOMPIST	
Gurmana	ZOMPIST	
Gyem	ZOMPIST	
Hungworo		Niffer Davey; Janneke Verhaar
Hun-Saare	BCCW	Esther Cressman; Donna Skitch
Iguta		Luc Bouquiaux
Iri	Dettweiler, Dettweiler & Dettweiler 1993	
Janji	BCCW; ZOMPIST	
Kambali	Koelle 1963[1854]	
Ngwoi	ZOMPIST	
Piti	BCCW	
Pongu		James MacDonnell
Reshe	BCCW	H. Apollos Agamalafiya

Language	Sources	Contributors for Chan (1998-2018)
Rijau	Dettweiler, Dettweiler & Dettweiler 1993	
Surubu	BCCW; ZOMPIST	
Tsishingini		David Crozier
Ut-Ma'in	Smith 2007	Becky Smith
Platoid		
Ayu	BCCW; Blench 2011	Linda Chinelo Nkamigbo; Samaila Jibrin
Birom	Bouquiaux 1962; Blench & Dendo 2006	Luc Bouquiaux
Boyawa	ZOMPIST	
Eggon	BCCW	Umbugadu Dauda Bitrus; Uche Aaron
Eten	BCCW; Blench 2012a	Luc Bouquiaux
Fyam	BCCW	Daniel Nettle
Hasha	Blench 2012c; BCCW	
Horom	BCCW; Blench 2010b; ZOMPIST	
Hyam	BCCW; Blench 2010a	Danjuma N. Gambo
Idong	ZOMPIST	
Ikulu		Ethelbert E. Kari
Irigwe		Daniel Gya
Izere	BCCW; Blench 2006	Kay Williamson; Ethelbert E. Kari
Kadara	ZOMPIST	
Kaje		Luc Bouquiaux
Kwanka	ZOMPIST	
Lijili		Gideon S. Omachonu
Mabo	ZOMPIST	
Mada	Blench 2011	Abiel Barau Kato
Morwa	ZOMPIST	
Ninzo	BCCW	Enene N. Enene
Nungu	BCCW; ZOMPIST	
Pyem	ZOMPIST	

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Language	Sources	Contributors for Chan (1998-2018)
Rukuba	ZOMPIST	
Sambe	Blench 2010c	
Tarok	BCCW	Roger Blench; Selbut Longtau
Tesu	Blench & Kato 2012	
Tyap	BCCW	Dennis Yahaya
Yeskwa	BCCW, Blench 2009; Koelle 1963[1854]	Gideon S. Omachonu

Table E.25: BC: Jukunoid

Language	Sources	Contributors for Chan (1998-2018)
Akum		Tamara Prischnegg
Bandawa	ZOMPIST	
Bete (Juk.)		Tamara Prischnegg
Jibu	BCCW	Perry; Anne Priest
Jukun	BCCW; Koelle 1963[1854]	
Kapya		Tamara Prischnegg
Kuteb		H. Apollos Agamalafiya; Robert Koops
Wapan	BCCW	Kiyoshi Shimizu
Yukuben		Tamara Prischnegg

Table E.26: BC: Nupoid

Language	Sources	Contributors for Chan (1998-2018)
Ebira	Koelle 1963[1854]	David Moomo
Gbari		Patrick and Heidi Rosendall
Gwari	Hyman & Magaji 1970	
Kakanda		Francis O. Oyebade
Nupe	Koelle 1963[1854]	Jason Kandybowicz

Table E.27: BC: isolates

Language	Sources	Contributors for Chan (1998-2018)
Akpes	Ibrahim-Arirabiyi 1989; Agoyi 2012	Francis Oyebade
Ikaan	Abiodun 2000; Blench 1994?; Borchardt 2011	Sophie Salfner
Lufu Oko		Tamara Prischnegg Joseph Atoyebi

Table E.28: Kwa

Language	Sources	Contributors for Chan (1998-2018)
Abbey Abiji	Hérault 1983; Rongier 2003 Hérault 1983	Steven Craig Chantal Tresbarats; Vick Renée
Abron Abure	Hérault 1983 Burmeister 1983; Rongier 2003	Andy Ring; Sammy Ntumy Ayité Epse Beugré Ably Pierrette
Adampe Adele	Koelle 1963[1854]	Jenny Rowe
Adiokrou Agni	Hérault 1983 Hérault 1983; Abiodun 2000; Keita 2008	Cocora Jacques
Ahanta Ahlo	ZOMPIST	Sammy Ntumy
Aja Akan		Terry; Nancy Sullivanand Mercy Akrofi Ansah; James Essegbey
Akebu Alladian	Hérault 1983	Jacques Sossoukpe
Anii Animere	CNL 1983	Deborah Morton Bryan Donald

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Language	Sources	Contributors for Chan (1998-2018)
Anufo		Jenny Rowe
Ari	Koelle 1963[1854]	
Ashanti	Koelle 1963[1854]	
Attié	Hérault 1983; N'Guessan 1996	Cocora Jacques
Avatime		Mununkum Divine
Avikam	Hérault 1983	
Awutu		Sammy Ntumy
Baoule	Hérault 1983	
Basila	Bertho 1951	
Baule		Cocora Jacques
Cherepon		Andy Ring; Sammy Ntumy
Chumburung	Snider 1989	Gillian Hansford
Dangme		Mary Esther Kropp Dakubu
Dwang		Andy Ring
Ebrie	Hérault 1983	
Ega	Bôle-Richard 1983	
Eotile	Hérault 1983	
Ewe		Antonin Azoti
Fon		Lazare Boko
Fon- Gbe	Koelle 1963[1854]	
Foodo		Gray Plunkett
Ga		Mary E. Kropp Dakubu
Gbe	Koelle 1963[1854]	Honorine Poidi-Gblem; Josh Ham; Séverin-Marie Kinhou
Gen		Séverin-Marie Kinhou
Ginyanga		Jenny Rowe
Guang	ZOMPIST	
Igo		Honorine Poidi-Gblem
Ikposo	Soubrier 2013	Jenny Rowe
Jwira		Sammy Ntumy
Kebu	ZOMPIST	
Kotafon		Honorine Poidi-Gblem
Kplang		Andy Ring

Language	Sources	Contributors for Chan (1998-2018)
Krache	Snider 1989	Andy Ring
Krobu	Hérault 1983	
Larteh		Mercy Akrofi Ansa; Jonas N. Akpanglo-Nartey
Lelemi		Andy Ring
Likpe	ZOMPIST	
Logba	Dorvlo 2008	Serchie Michael; Kofi Dorvlo
Maxi-Gbe	Koelle 1963[1854]	Honorine Poidi-Gblem
Mbato	Hérault 1983	
Nawuri	Snider 1989	Rod Casali
Nchumburu	ZOMPIST	
Nkonya		Wesley and Katie Peacock
Nyangbo		Serchie Michael; James Essegbey
Nzema	Hérault 1983	Jonathan Burmeister
Saxwe		Josh Ham
Sefwi		Sammy Ntumy
Sekpele		Cephas Delalorm; Andy Ring
Selee		Andy Ring
Siwu		Andy Ring
Tuwuli	Harley 2005	Andy Ring
Twi	Christaller 1933	
Waci-Gbe		Jenny Rowe
Xwla	Koelle 1963[1854]	Séverin-Marie Kinhou

Table E.29: Ijo

Language	Sources	Contributors for Chan (1998-2018)
Defaka	Blench 2007	Inoma Essien
Ibani	Green et al. 2005; Blench 2007	Ebitare F. Obikudo
Ijaw		Tamaraukuro Prezi
Nembe	Kaliai 1964; Blench 2007	

Table E.30: Kru

Language	Sources	Contributors for Chan (1998-2018)
Aizi	Marchese 1983	
Bakwe	Marchese 1983	Csaba Tokpa Leidenfrost
Bassa	Marchese 1983; Koelle 1963[1854], CEFL	Donald Slager
Bete	Marchese 1983	Paul Shaddick; Hannah Leigh Sande; Cocora Jacques
Dewoin	Thomas 1916b; Marchese 1983	Donald Slager and William Boen
Dida	Marchese 1983; Guéhoun 1993	Wolfgang David Cirilo de Melo
Gbii	Koelle 1963[1854]	Daniel Gya; David Drevlow
Glio-Oubi	Marchese 1983	Lynell Zogbo
Godié	Rongier 2003	Cocora Jacques
Grebo	Marchese 1983; Innes 1967	David Drevlow; Jim Laesch
Klao	Marchese 1983	David Drevlow; Donald Slager
Kodia		Csaba Tokpa Leidenfrost
Krahn	Marchese 1983	David Drevlow
Krumen	Marchese 1983	Peter Thalmann; Donald Slager
Kuwa	Marchese 1983	Dale; Alvina Dederwitz
Neyo		Lynell Zogbo
Nyabwa	Marchese 1983	Julie Bentinck
Sapo		Donald Slager
Seme	Vogler 2015; Marchese 1983	Raymond Boyd; Paul Thiessen
Tajuasohn		David Drevlow
Wané		Csaba Tokpa Leidenfrost
Wobe	Egner 1989	Verena Hofer

Table E.31: Isolates

Language	Sources	Contributors for Chan (1998-2018)
Bangime	Hantgan 2012; Durieux & Durieux-Boon 1998	Abbie Hantgan
Gola	Westermann 1921; Koelle 1963[1854]	Quaye B. Gray
Laal	Boyeldieu 1982	Pascal Boyeldieu; Florian Lionnet
Limba	Clarke 1922; Koelle 1963[1854]; Vydrin n.d.	Donald Slager, Valentin Vydrin
Sua	Segerer 1998; Wilson 2007	Guillaume Segerer

Table E.32: Kordofanian

Language	Sources	Contributors for Chan (1998-2018)
Acheron		Russell Norton
Dagik	Vanderelst 2016; ZOMPIST	John Vanderelst
Heiban	Guest 1997	
Jomang	ZOMPIST	
Katla		Birgit Hellwig
Koalib		Nicolas Quint; Rauf Rahmatallah Kodi
Lafofa	ZOMPIST	
Laro	ZOMPIST	Nabil Abdalla Kuku
Logol	ZOMPIST	
Lumun	Blench n.d.-a	Thomas Kuku Alki Tombore
Moro	Blench 2005	Sharon Rose
Nding	ZOMPIST	
Orig	Schadeberg & Elias 1979	
Rere	ZOMPIST	
Shirumba	ZOMPIST	
Tagoi		Thilo C. Schadeberg
Talodi	ZOMPIST	
Tegali	ZOMPIST	Russell Norton
Tegem	ZOMPIST	
Tima		Gertrud Schneider-Blum
Tira		Thomas Kuku
Tocho	ZOMPIST	
Utoro	ZOMPIST	Thomas Kuku
Warnang		Nicolas Quint

Table E.33: Adamawa

Language	Sources	Contributors for Chan (1998-2018)
Awak	Jungraithmayr 1968; Boyd 1989	Gareth Mort
Ba	Boyeldieu 2017	
Bali		Selbut Longtau
Bangunji		Danjuma N. Gambo
Besme		Dakinodji Ngarmdjebé
Bolgo	Boyd 1989; de Rendinger 1949; Joly 1935	
Bua	Lukas 1937; Boyeldieu 2017	
Burak	Jungraithmayr 1968; Boyd 1989	Danjuma N. Gambo
Dadiya	Jungraithmayr 1968	Danjuma N. Gambo
Dama	ZOMPIST	
Day	Nougayrol 1980; Boyd 1989	Silke Sauer
Dii	Boyd 1989	Lars Lode
Dijim	Jungraithmayr 1968	Danjuma N. Gambo
Dirrim	Boyd 1989	
Doyayo		Lars Lode
Duru	Boyd 1989	
Duupa		Lars Lode
Fali	Sweetman 1981	Mary Annett
Fanya	Joly 1935	
Gã	ZOMPIST	
Galke	Boyd 1989; ZOMPIST	
Gandole	ZOMPIST	
Gəunəm		Ulrich Kleinewillinghöfer
Gimme		U. Kleinewillinghöfer; Lars Lode
Gula	Boyd 1989	
Jenjo	ZOMPIST	
Kaan		Ulrich Kleinewillinghöfer
Kam	Boyd 1989	

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Language	Sources	Contributors for Chan (1998-2018)
Karang	Boyd 1989	Bob Ulfers
Kim		Dakinodji Ngarmdjebé
Koke	Lukas 1937	
Kolbila		Lars Lode
Kotopo	ZOMPIST	
Kulaal	Pairault 1969; Boyd 1989	
Kumba	ZOMPIST	
Kwa		Ulrich Kleinewillinghöfer
Longto		Ulrich Kleinewillinghöfer
Longuda	Jungraithmayr 1968; Boyd 1989	Ulrich Kleinewillinghöfer
Longurama	ZOMPIST	
Lua	Boyeldieu 2017	
Mambai	Boyd 1989	Erik John Anonby
Mangbai	ZOMPIST	
Mbum	Boyd 1989	Dakinodji Ngarmdjebé
Mom Jango	ZOMPIST	
Momi	Blench n.d.(a)	Katy Barnwell
Mumuye	Shimizu 1983	Danjuma N. Gambo
Mundang		Sergent Joseph; Padeu Dakouli
Munga	Boyd 1989	
Niellim	Boyd 1989; Lukas 1937; Boyeldieu 2017	Don, Don, Pat Stocksdales
Nimbari	ZOMPIST	
Pam	Boyd 1989	
Peere	Raen 1985; Boyd 1989	Konstanse Raen
Pere	Raen 1985	
Samba Leko	Fabre 2001; Boyd 1989	Lars Lode
Taram	ZOMPIST	
Teme	ZOMPIST	
Tula	Jungraithmayr 1968; Blench & Kato 2012; Boyd 1989	Daniel Gya
Tunya		Dakinodji Ngarmdjebé
Tupuri	Ruelland 1988	Suzanne Ruelland
Vɔ̀mnɔ̀m		Ulrich Kleinewillinghöfer

Language	Sources	Contributors for Chan (1998-2018)
Vere	Boyd 1989	
Waja	Jungraithmayr 1968	Ulrich Kleinewillinghöfer
Waka	Boyd 1989	
Wom	ZOMPIST	
Yendang	Blench et al. 2009	Rev. H. Apollos Agamafiya
Yingilum	Kraft 1981	
Yungur	Boyd 1989	
Zan Gula	de Rendinger 1949	Silke Sauer

Table E.34: Ubangi

Language	Sources	Contributors for Chan (1998-2018)
Baka	Brisson & Boursier 1979; Moñino 1988	Yves Léonard
Banda	Eboué 1918	Alfred Siango; France Cloarec-Heiss; Pascal Boyeldieu
Bayanga	Ouzilleau 1911	
Bokoto		Edouard Koya
Bomasa	Ouzilleau 1911	
Gbanzili	Moñino 1988	Jacqueline Thomas
Gbaya	Roulon-Doko 2008	
Gbaya Mbodomo	Moñino 1988 ; Boyd 1996	Ginger Boyd
Gbaya-Bossangoa	Moñino 1988	Thomas Elvis Guenekean
Gundi	Ouzilleau 1911	
Mba	Moñino 1988	Maryanne Augustin
Mbanza	Moñino 1988 ; Cloarec-Heiss 1997; Tingbo 1971	Elaine Thomas
Mono	Olson 1996	
Ndogo		Wanda Pace; Peter Rebigo

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Language	Sources	Contributors for Chan (1998-2018)
Ngbaka	Moñino 1988	Elaine Thomas; Jacqueline Thomas
Ngbandi		Elaine Thomas
Pambia	ZOMPIST	
Sango	Moñino 1988 ; Eboué 1918	
Sere	Moñino 1988	
Tagbu	ZOMPIST	
Yakoma	Moñino 1988	Pascal Boyeldieu
Zande	Moñino 1988	Raymond Boyd

Table E.35: Dogon

Language	Sources	Contributors for Chan (1998-2018)
Ben Tey	Heath 2013	Jeff Heath
Dogulu Dom	Kéné 1997	Brian L. Cansler; Josue Teme
Donno So	Durieux & Durieux-Boon 1998; Kéné 1997; Newcomer 2000	Chris Culy
Jamsay	Heath 2013; Kéné 1997; Newcomer 2000	Jeff Heath
Kolum So	Heath et al. 2015 ; Durieux & Durieux-Boon 1998; Kéné 1997; Newcomer 2000	
Mombo		Kirill Prokhorov
Najamba	Heath 2013	Jeff Heath
Perge Tegu	Heath 2013	
Tene Kan	Heath 2013; Durieux & Durieux-Boon 1998; Kéné 1997	
Tommo So	Durieux & Durieux-Boon 1998; Kéné 1997; Newcomer 2000	Laura McPherson

Language	Sources	Contributors for Chan (1998-2018)
Toro So	Calame-Griaule 1956; Durieux & Durieux-Boon 1998; Kéné 1997	Abbie Hantgan; Timothée Kodio; Josue Teme
Yanda Dom	Durieux & Durieux-Boon 1998	Jeff Heath
Yorno So	Heath 2013	

Table E.36: Mel

Language	Sources	Contributors for Chan (1998-2018)
Baga Koba	Wilson 2007	
Baga Maduri	Wilson 2007	Frank Seidel
Baga Sitemu	Ganong 1998; Lamp 2016; Wilson 2007	Martin Ganong
Bom	Childs 2012	
Bullom	Koelle 1963[1854]	Tucker Childs
Kisi	Childs 2000	Tucker Childs
Krim	Childs 2012	
Landuma	Sumbatova 2012; Rogers & Bryant 2012	Kirk Rogers
Mani	Childs 2012	
Sherbro	Pichl 1967	
Temne	Thomas 1916a,b; Dalby 1966; Wilson 2007	David Odden; Sullay Mohamed Kanu

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Table E.37: Gur–Senufo

Language	Sources	Contributors for Chan (1998-2018)
Akaselem	Winkelmann 2007a	Aboubakari Sama
Baatonum		Issa O. Sanusi
Bago-Kusuntu		Antonin Azoti
Bariba	Koelle 1963[1854]	
Biali		Brigitte Reineke
Bimoba		Mary Steel
Birifor		Pascal Hien; Nancy Schaefer
Buli		Anne Schwarz
Bwamu	Bloemarts & de Rasilly 2012	Sharyn Thomson; Lukas Neukom
Cebaara		Merrill Skinner
Chakali	Brindle 2017	Jonathan A. Brindle
Chala		Ulrich Kleinewillinghöfer
Dagaara		Colin Mills; Ed Hall
Dagbani		André A. Wilson
Deg		Marjorie Crouch
Delo		Georgina Addo-Frempong
Dinaoro	Sawadogo 2002	
Ditammari		Brigitte Reineke; Jenny Rowe
Djimini		Ouattara Nambalapan Matthieu
Dogose	Winkelmann 2007b	Margaret Langdon
Dogoso	Winkelmann 2007c	
Dyan		Henoc Kam; Isaac Ouattara
Faniagara	Sawadogo 2002	
Farefare	Miehe 2007a	Urs Niggli
Gurma	Koelle 1963[1854]	Jean-Claude Naba
Hanga		Geoffrey Hunt
Kaansá		Gloria Scott
Kabiye	CLNK 1999	Antonin Azoti
Kamara		Tony Naden
Kantosi		Tony Naden
Karaboro		Klaudia Dombrowsky-Hahn; Marlis Bühler

Language	Sources	Contributors for Chan (1998-2018)
Kasem	Koelle 1963[1854]	Emilio Bonvini; Urs Niggli; Allison Howell
Kawara	Sawadogo 2002	
Khe	Winkelmann 2007d	
Khisa	Miehe 2007b	Bärbel Redmer
Kiamba	Koelle 1963[1854]	
Kirma		Emmanuel Soulama; Ruth Hürlimann
Konkomba		Mary Steel
Konni		Michael Cahill
Kulango	Elders 2007	Andy Ring and Sammy Ntumy; Kra Enoc; Mary Esther Kropp Dakubu
Kurumfe	Beyer 2007	John Rennison
Láá Láá		Adolphe Houmboue
Lama		Neal Brinneman
Lamba	ZOMPIST	
Lobi		Ken Joslin
Lobi (Lobiri)	Miehe & Tham 2007; ZOMPIST	
Lorhon	ZOMPIST	
Lyele		Rhonda Hartell
Mamara	Association pour la promotion de la langue Mamara 2009	Dan Brubaker
Mampruli	Miehe 2007c	Tony Naden
Mbelime	Reinike 2007a	Johannes Merz
Miyobe	Rongier 1996	Ulrike Heyder
Moba	Bakpa & von Roncador 2007	Jann Russell
Moore		Jenny Rowe
Mosi	Koelle 1963[1854]	
Nafaanra		Dean Jordan
Natani		Brigitte Reineke; Jenny Rowe
Natioro	Sawadogo 2002; Prost 1968	
Nawdm	Fiedler 2007a	Jenny Rowe
Negeni	Sawadogo 2002	
Ngangam		N'Touame N. Pakdembè; Jenny Rowe

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Language	Sources	Contributors for Chan (1998-2018)
Niansogoni	Sawadogo 2002	
Notre		Tony Naden
Ntcham		Monica Cox
Nuni		Norbert Naon; Corneille A. Kadio
Nyarafolo		Linnea Boese
Paasaal		Sylvester Nkrumah
Palaka		Mandy Caley
Palen	Kleinewillinghöfer 2007	
Phuie		Kevin Warfel
Safaliba		Paul Schaefer
Senari	ZOMPIST	
Shempire		Thomas R. Requadt; Thomas R. Requadt
Sicité		Anne Garber Kompaoré
Sisaala		Rhonda Hartell; Moses Luri
Sourani	Sawadogo 2002	
Supyire	Carlson 1994	Robert Carlson
Syer	Dombrowky-Hahn 2012	
Tagwana		Klaudia Dombrowsky-Hahn
Tampulma		Claire Gray
Teen		Paul Brigg; Esther Petermann
Tem		Jenny Rowe
Tenyer	Dombrowky-Hahn 2007	
Tiefo		Kerstin Winkelmann; Ouattara Ibrahima
Timba	Sawadogo 2002	
Toussian		Silvia Zaugg-Coretti; Trudi Pleis
Turka		Colin Suggett
Tusia	Winkelmann 2007f	
Tyurama	Suggett 2003	
Vagla		Marjorie Crouch
Viemo	Winkelmann 2007e	Nate Severance
Waama	Reinike 2007b	Jenny Rowe
Wali		Jonathan A. Brindle

Language	Sources	Contributors for Chan (1998-2018)
Wara	Prost 1968	Virpi Kalliorinne
Winyé		Bizéni Tiemounou
Yom	Fiedler 2007b	Dorothy J. Forsberg

Table E.38: Mande

Language	Sources	Contributors for Chan (1998-2018)
Bamana	Dumestre 2011; Vydrin & Perekhval'skaya 2015	
Bandi		Daria Mishchenko; Jaa Ngaima Kawala
Beng	Paperno & Maloletnyaya 2017	Alma Gottlieb
Bisa		Henning Schreiber
Bobo	le Bris & Prost 1981	Wilma Wolthuis
Boko	Jones 1998	Ross Jones
Bokobaru	Jones 2004	Ross Jones
Bozo	Smeltzer & Smeltzer 1995; Blecke 1996	Anne-Marie Klade; Christiane Lauschitzky
Busa		Ross Jones
Dan	Vydrin 2017	Margrit Bolli
Duongoma	Hochstetler 1996	
Dzuun	Solomiac 2014; Prost 1958	Paul Solomiac; Bart; Jacqueline Eenkhoorn
Guro	Kuznetsova & Kuznetsova 2017; Grégoire 1975	Olga Kuznetsova
Jalonke	Creissels 2010	Friederike Lüpke; Sullay Mohamed Kanu
Jowulu	Carlson 1993; Djilla et al. 2004	Lee Hochstetler

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Language	Sources	Contributors for Chan (1998-2018)
Jula		Nate Severance; Moussa Diakit�
Kakabe	Vydrina 2017	Daria Mishchenko (data: Alexandra Vydrina)
Kono	Lessau & Kastenholz 1989	Raimund Kastenholz
Kpelle	Konoshenko 2017; Westermann & Melzian 1930	Daria Mishchenko; Dunne Sannah
Kuranko		Phillip Logan
Kyanga		Marlene Altebockwinkel; Henning Schreiber; Ross Jones
Lele	Vydrine 2009	Marc Gebhard
Ligbi		Andrew; Janet Persson
Looma	Mishchenko 2017	Daria Mishchenko
Mandinka	Creissels & Sambou 2013	Denis Creissels
Mano	Khachaturyan 2012	Donald Slager
Marka Dafing		Steve Clouse
Matya Samo	Morris et al. 2011	Henning Schreiber
Maya Samo	Morris et al. 2011	Marc Koussoube
Mende		James Kaiser
Mwan	Perekhvalskaya 2017	Karen De Graaf
Samo		Jean-Pierre
San	Burkina 2003	
Seenku		Laura McPherson
Shanga		Ross Jones
Soninke	Halaoui 1990; Creissels 2016; d'Avezac 1845	Brad Smeltzer
Susu		Jim Kaiser
Tura		Thomas Bearth
Vai	Welmers 1976	David Drevlow
Wan	Nikitina 2017	Bomisso Gbayoro Mathias
Yaure	Kushnir 2017	Frank Lautenschlager

Table E.39: Atlantic

Language	Sources	Contributors for Chan (1998-2018)
Baga Fore	Golovko 2010	Gene Bacon
Baga Mboteni	Ferry n.d. Wilson 2007	
Balant	Creissels & Biaye 2015	
Banjaj	Barry 1987; Bassène 2006; Carlton & Rand 1993; 1994	
Bapen	Ferry 1991	
Basari	Ferry 1991	
Bayot	Barry 1987; Carlton & Rand 1993; 1994	Jon Manga; Wolfgang Berndt
Bayot (Guinea B.)	Barry 1987; Carlton & Rand 1993; 1994	Jon Manga
Bayot (Sénégal)	Diagne 2009; Carlton & Rand 1993; 1994	Wolfgang Berndt
Bedik	Ferry 1991	
Biafada	Wilson 1993	Alain Christian Bassene
Bijogo	Segerer 2002	
Bliss	Barry 1987; Carlton & Rand 1993; 1994	
Ejamat	Carlton & Rand 1993; 1994	
Feloup	d'Avezac 1845; Wilson 2007; Carlton & Rand 1993; 1994	
Fogny	Sapir 1993[1970]; Wilson 2007; Weiss 1939	
Fula	Seydou 2014; Tourneux & Yaya 1998	
Fulfulde	de Wolf 1994; Taylor 1921	
Ganja	Creissels & Biaye 2015	

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Language	Sources	Contributors for Chan (1998-2018)
Gusilay	Barry 1987; Carlton & Rand 1993; 1994	Serge Sagna
Jaad	Meyer 2001; Wilson 2007	Rebecca Cover
Joola	Barry 1987	
Karon	Sambou 2007; Wilson 2007; Carlton & Rand 1993; 1994	Sarah Wilkinson
Kasa	Sambou 1979; Wintz 1909; Carlton & Rand 1994	
Kasanga	Wilson 2007; ZOMPIST	
Keeraak	Carlton & Rand 1993; 1994; Segerer & Robert 2017	
Kentohe	Doneux et al. 1984; Wilson 2007	
Kobiana	Wilson 2007; ZOMPIST	
Konyagi	Sachot (Santos) 1996; Ferry 1991	
Kwaatay	Payne 1992; Wilson 2007; Carlton & Rand 1993; 1994	Stephen Payne
Laala	Dièye 2011; Pichl 1981	Maria Soukka, Heikki Soukka
Manjak	Doneux 1975; Buis 1990; Wilson 2007	
Mankanya	Trifkovic 1969; Wilson 2007; Gaved & Stammers 2004	Robert Koops
Mlomp	Barry 1987; Carlton & Rand 1993; 1994	
Nalu	Seidel 2013; Wilson 2007	Frank Seidel; Kirk Rogers
Ndut	Williams & Williams. 1993	Dan Morgan
Noon	Williams & Williams. 1993	Maria Soukka

Language	Sources	Contributors for Chan (1998-2018)
Nyun	de Lespinay 1992; Bühnen 1988	
Nyun Djibonker	de Lespinay 1992; Bühnen 1988	
Nyun Gubëeher	Cobbinah 2013	Alexander Cobbinah
Nyun Gujaxer	de Lespinay 1992; Bühnen 1988; Wilson 2007	
Nyun Gunyamolo	Bao Diop 2013	Sokhna Bao-Diop
Palor	d'Alton 1987; Williams & Williams. 1993	Dan Morgan
Pepel	Ndao 2011; Wilson 2007	Dame Ndao
Safin	M'Bodj 1983; Williams & Williams. 1993	Hillebrand Dijkstra
Sereer	Crétois 1973-1977	Marie Renaudier
Tanda	Ferry 1991; Wilson 2007	
Wolof	Diouf 2003	

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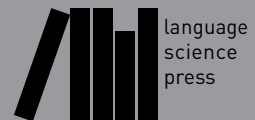
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The numeral system of Proto-Niger-Congo

This book proposes the reconstruction of the Proto-Niger-Congo numeral system. The emphasis is placed on providing an exhaustive account of the distribution of forms by families, groups, and branches. The big data bases used for this purpose open prospects for both working with the distribution of words that do exist and with the distribution of gaps in postulated cognates. The distribution of filled cells and gaps is a useful tool for reconstruction.

Following an introduction in the first chapter, the second chapter of this book is devoted to the study of various uses of noun class markers in numeral terms. The third chapter deals with the alignment by analogy in numeral systems. Chapter 4 offers a step-by-step reconstruction of number systems of the proto-languages underlying each of the twelve major NC families, on the basis of the step-by-step-reconstruction of numerals within each family. Chapter 5 deals with the reconstruction of the Proto-Niger-Congo numeral system on the basis of the step-by-step-reconstructions offered in Chapter 4. Chapter 6 traces the history of the numerals of Proto-Niger-Congo, reconstructed in Chapter 5, in each individual family of languages.

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