

SEGMENT REVERSAL IN KULIAK AND ITS RELATIONSHIP TO NILO-SAHARAN

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Abstract

The paper discusses a pervasive feature of the Kuliak languages, a branch of Nilo-Saharan, consisting of two living languages, Ik and So, plus the moribund Nyang'i. Many CV syllables in cognate forms in other branches of Nilo-Saharan are realised as VC in Kuliak. This feature is not so constant as to constitute a morphological rule but applies to a significant number of lexemes in comparison with other Nilo-Saharan languages. The paper begins with an introduction to the literature on Kuliak languages and their status, then provides data tables from unpublished and published sources to support the existence of this process. The hypothesis of the author is that this arises at the interface between morphology and phonology, and that it arises from the convergence of two processes: affix copying of common elements (-k- and -t-) and erosion from the front.

Keywords: Nilo-Saharan, Kuliak, morphology, historical linguistics, Uganda

1. INTRODUCTION

Metathesis is usually defined as the interchange of two or more contiguous or non-contiguous or segments or syllables. It was first identified in Key (1854), who gives the examples of -ps- becoming -sp- in the transition from Anglo-Saxon to modern English. Thus:

1.	Modern English	Anglo-Saxon
	<i>wasp</i>	<i>vāps</i>
	<i>aspen tree</i>	<i>apse</i>

Examples how Latin is realised in modern Spanish illustrate the process of swapping non-contiguous segments:

2.	Gloss	Latin	Spanish
	danger, peril	<i>periculum</i>	<i>peligro</i>
	crocodile	<i>crocodilus</i>	<i>cocodrilo</i>

This type of sporadic change is unsystematic and does not form part of widespread morphological or grammatical systems. It applies to specific consonant pairs and could be characterised as phonological, something speakers find easier to analogue within their idiolect.

However, in the Kuliak languages of north-eastern Uganda, there is evidence for a widespread feature of segment reversal. Characteristically, forms that are CV in other branches of Nilo-Saharan can surface as VC in Kuliak. This relationship is not unknown between and within other branches of Nilo-Saharan but it is strikingly prevalent in Kuliak. Unlike the examples of metathesis given above, it can occur between almost any consonant/vowel pair, hence it does not appear to be sporadic phonologisation. There is no evidence it is a grammatical procedure, and I propose it is an outcome of the combination of a common process in Nilo-Saharan, erosion from the front, and the sporadic application of ‘moveable affixes’.

The paper¹ presents data in support of this hypothesis. Section 2 provides a summary of the literature and status of Kuliak languages and Section 3 introduces some aspects of Kuliak morphology. The prevalence of segment reversal, both in the case of Kuliak languages in relation to other Nilo-Saharan comparanda, and also more broadly within Nilo-Saharan, is illustrated in the data tables in Section 4. Section 5 illustrates my hypothesis concerning the erosional pathways which may have resulted in the synchronic Kuliak forms.

2. INTRODUCTION TO THE KULIAK LANGUAGES

2.1 The Kuliak peoples today

Kuliak is usually said to consist of four languages, two of which are living, spoken in NE Uganda and adjoining regions of Kenya. The term ‘Rub’ is used in Ehret (2001) based on the common term for ‘person’, but has not been generally adopted. The terminology of Kuliak languages is given in Table 1:

Table 1: The terminology of Kuliak languages

Name	Autonym	Other names
Ik	Ic’am pl. Ik ⁿ	Teuzo, Icietot, Teuso, Teuth Ngulak
So	Sor’at pl. Soo	So, Soo, Tepeth
Nyangi	Nyangi’at pl. Nyang’i	Nyani, Nyangeya, Ngiangeya, Nipori, Niporen, Poren, Ngapore, Upale
Dorobo		Wanderobo

Dorobo is known only from Wayland (1931), analysed in Heine (1976), but no speakers have been encountered in recent times. Schrock (2015) considers that Wayland’s list was Ik, and that mistakes in elicitation have made it seem distinct. Driberg (1932: 604-605) recorded the first wordlist of Nyang’i and had already noted that the ‘Nyangiya’ were switching to Dodoth, a Nilotic language; he estimated there were a ‘few hundred’ speakers in the early 1930s. Heine (1974/1975) recorded almost all that is known of the language and noted there were no speakers

¹ I would like to thank researchers who have sent me unpublished data and comments over the years, in particular Eithne Carlin, Terrill Schrock and Sam Beer. The comments of two anonymous referees helped me sharpen up the argument of the paper.

under forty years of age. Fleming (1983) refers to a manuscript on Nyangiya by Weatherby but this has not been circulated. Beer (p.c.) has recently worked with the last remembers of the language. Schrock (p.c.) was able to record a short wordlist from rememberers. Beer (2017) contacted some speakers in the 2010s and described the contraction of their grammatical system.

The So are a group of former hunter-gatherers living on three mountains, Moroto, Napak and Kadam, in northeast Uganda. They were researched in the 1960s by Weatherby (1969), Laughlin (1975), and Laughlin and Allgeier (1979). They have become dispersed among the Karimojong, and their society has undergone a significant breakdown since this era. The first account of the So language is in Heine (1974/1975), with a more extended description in Carlin (1993). The So language was still quite vigorous when Carlin was in the field but was already in decline, giving way to Karimojong. An unpublished dictionary (Heine and Carlin n.d.) is available on the internet.² There is a somewhat difficult of access study of So ethnobotany (Heine and König 1988). More recently, another grammatical sketch has been circulated (Beer et al. 2009). So is only spoken by around 60 older speakers who live scattered in Karimojong communities and no longer form a speech community.

The Ik (Icétód) people live in a number of parishes in Moroto district, NE Uganda (Map 1). Today they are farmers and cattle-keepers but they were probably hunter-gatherers until recent times. The first study to draw attention to the Ik people was the work of the anthropologist Colin Turnbull (1967, 1972). He painted such a depressing account of Ik society that this was taken as an illustration of 'ultimate evil' and indeed turned into a piece of fashionable theatre. Regrettably (though not for the Ik) his account turned out to be largely nonsense (Heine 1985). By all accounts, the Ik, though still marginal, are flourishing, especially since the threat of Turkana raiding has been much reduced.

² At <http://www.rogerblench.info/Language%20data/Nilo-Saharan/Kuliak/So%20dictionary.pdf>

Map 1: Ik-speaking area of NE Uganda

Source: Redrawn from Wiedemann and Nannyombi (2007)

Table 2 gives a summary of the status of the Kuliak languages. Given the considerable interest in endangered languages, it is a pity that these important and rapidly disappearing languages have received only limited attention.

Table 2: Status of the Kuliak languages

Name	Status	Reference
Ik	16,000 ³	2002 census
So	60 speakers	Beer et al. (2009)
Nyang'i	only rememberers	Beer (2017)
Dorobo	probably not distinct	Heine (1975)

³ This figure seems very high and is derived from census reports. Most likely there are many less fluent speakers of Ik.

2.2 Documentation of Kuliak languages

Since the first documentation appeared, the classification of the Kuliak languages, largely represented by Ik, has been the subject of continuing controversy and a great deal of misinformed speculation. Greenberg (1950), in his first overview of African language classification, treated 'Nyangiya' as a separate language group, a position he maintained through several revisions of his views. Tucker and Bryan (1956: 93) were the first to recognise the three/four languages we now consider as forming the Kuliak group, but they put forward no further suggestions as to their external affiliation. When Greenberg (1963) came to synthesise his African language classifications, Kuliak was placed within Eastern Sudanic. Regrettably, the *Ethnologue* echoed this view until recently, despite Heine's (1975/1976) critique. The *Glottolog*, in common with its sceptical approach to the Nilo-Saharan phylum, regards Kuliak as an isolate, or unclassified.

Fleming (1983) has a lengthy essay on the external affiliations of the Kuliak lexicon. He considers connections with both Nilo-Saharan and Afroasiatic languages, especially Cushitic and Omotic. Unlike the correspondences with Southern Nilotic, many of these can only be adopted with the eye of faith. Both semantics and phonology are highly variable, and few of his proposals would be accepted unequivocally. At the same time, there is no doubt that the Kuliak languages have interacted with their Afroasiatic neighbours to the east and north, and this in turn has been the source of considerable speculation. Tucker (1971-3) misleadingly referred to similarities with Cushitic and Ancient Egyptian, and Lamberti (1988) wrote a book-length study on the similarities to Eastern Cushitic, claiming there was a genetic relationship. It is safe to say that while these must sometimes represent cognate words, this is a consequence of borrowing. One important aspect of contact is the spread of case systems in Africa (König 2008). Case-marking is probably not an underlying feature of Nilo-Saharan, but it is widespread in the eastern branches which have been in contact with Afroasiatic, including Kuliak. It is likely that case-marking spread from one phylum to another (and indeed into Niger-Congo, where it is recorded in the Koalib group of Kordofanian).

Subsequent authors, taking a broader perspective on Nilo-Saharan, have treated Kuliak as a distinct branch of Nilo-Saharan. Bender (1997) published many overviews of Nilo-Saharan, treating Kuliak as a single branch outlier, parallel with, but showing no particular relationship to, Songhay and Saharan. Bender rejects any particular relationship with Eastern Sudanic. Ehret (1981b, 2001) typically takes an entirely different view. He renames Eastern Sudanic 'Eastern Sahelian' and makes 'Rub' (i.e., Kuliak) one of its co-ordinate branches.

Recent years have seen a significant expansion of lexical data on Kuliak languages (Heine 1999, Heine and Carlin n.d., Beer et al. 2009, Schrock 2017), as well as studies of the grammar (e.g., Serzisko 1992, König 2002), and it is time to take a more informed perspective. Certainly, the evidence presented for previous classifications is extremely thin. Kuliak is a distinct branch, but co-ordinate with a large grouping of languages spread across Sudan, including Eastern Sudanic, Kadu,

Mabaan and probably Fur. Kuliak has a number of morphological features, including singulatives in *-tV-* (*-at-* in Kuliak), which align it with these languages and which do not occur in Gumuz, Koman, Bertha and Kunama. Kuliak has some apparent similarities in phonology with Koman due to early interaction with Afroasiatic languages, but these do not point to a genetic relationship.

Wayland (1931) published a vocabulary of Ik, and Father Crazzolara (1967) produced an unpublished grammar and vocabulary. The first modern account of the Ik language appeared in Tucker (1971-1973), and even apart from comparisons with Ancient Egyptian [!] the description was disturbingly inaccurate. Serzisko (1987, 1988, 1989, 1992) and Heine (1975/76, 1990, 1999) have described some aspects of its structure. Other studies from the same group of scholars include the lengthy account of case in Ik by Christa König (2002). Unlike the other languages in this group, Ik appears to be still vigorous (Wiedemann and Nannyombi 2007) and a locally published lexicon has been issued as part of a vernacular education programme (Schrock 2011). A more comprehensive overview of both the grammar and lexicon of Ik is Schrock (2017). A 1700 item wordlist with audio recordings is available on the Comparalex website. Heine (1976) is a comparative grammar and vocabulary of proto-Kuliak, providing reconstructed forms. Serzisko (1989) is an overview of the structural features of the group as a whole. Ehret (1981a) puts forward some proposals for revising this, based on a re-analysis of Heine's materials. However, with the extensive lexical material available today, a more in-depth comparison is now possible.

3. INTRODUCTION TO KULIAK MORPHOLOGY

Kuliak languages are undoubtedly Nilo-Saharan, despite clear evidence for contact with Cushitic (Lamberti 1988). The elaborate phonology, which includes a glottalised series, may also reflect Afroasiatic contact. The Koman and Gumuz languages also have similar phonemes, which led Ehret (2001) to conclude, erroneously, that these were to be attributed to proto-Nilo-Saharan. Ik also has lateral fricatives, which either reflect contact with a former substrate language such as Hadza, or else were features of Cushitic at some earlier stage, as they are of Southern Cushitic today (see discussion of their areal context in Beer et al. n.d.). Typical features of the morphology are the three-term number system with a singulative in *-at* and the complex verbal extension system. The case-marking system strongly resembles that found in Eastern Sudanic languages (König 2008, Dimmendaal 2001, Schrock 2017), but whether this is an archaic feature or a consequence of Afroasiatic contact is still unresolved.

However, apart from these underlying features, there appear to be layers of borrowing from Nilo-Saharan. Heine (1976) first observed an apparent relationship between Kuliak and Southern Nilotic and Rottland (1983) undertook a systematic comparison, demonstrating a number of close lexical correspondences. Heine (1976: 71) considered various hypotheses to explain this and suggested the

possibility that there was once a much larger group of languages which covered an area well to the south of their present region. As Southern Nilotic expanded, Kuliak was maintained as a substrate within its basic lexicon. Ehret (1981b) made a rather contorted argument for the existence of a lost branch of Southern Nilotic influencing Kuliak, but Rottland (1983) shows this is quite unnecessary. These similarities were undoubtedly the source of the mistaken idea that Kuliak was a part of Eastern Sudanic, and incidentally a good illustration of the erroneous conclusions that can sometimes result from ‘mass comparison’. A more credible interpretation of the similarities with Southern Nilotic is that these languages were further north when they interacted with the ancestors of modern Kuliak. The borrowings are probably not in a single direction but reflect the usual mosaic produced by contact when highly mobile populations are in touch with one another.

In more recent times, direct contact with the Karimojong people (and indeed sometimes violent conflict), as well as the creation of a national park in the region, have meant extensive borrowing and, in the case of the So and Nyang’i, assimilation. Most So speakers have switched to Karimojong, and even when the language was recorded by Heine and Carlin in the 1980s, there were many loans, as well as doublets, where older forms persist alongside the loans. Since the languages are related at some deeper level, and there is undoubtedly also re-analysis, sorting out the history of some words is complex.

A tripartite numbering system can be reconstructed for proto-Kuliak nominals. In Ik, So and, less commonly, in Nyang’i, most nouns have a singulative in *-at*. Carlin (1993: 74) notes the similarity to Karimojong and assumes this is a borrowing. However, Kuliak typically metathesises common Nilo-Saharan markers, and *-ta* is a widespread singulative. Ik nominal number-marking strategies are shown in Table 3.

Table 3: Ik nominal number-marking

Singular	Plural
-∅	-íkó/-ítíní/-íka
(-εdε-)	-mɪ-
- ́Vma-	-∅

So has an additional singulative, *-an*. By comparison with Ik, So has quite a diverse range, some of which have semantic associations (Table 4).

Table 4: So plural suffixes

Suffix	Semantics	Comment
<i>-ek</i>	body parts	also Ik
<i>-tin</i>	human artefacts	also Ik
<i>-e</i>	diverse	
<i>-ut (-ot, -ut, -ut)</i>	diverse	
<i>-an</i>	human artefacts	cf. Ik singulative
<i>-uk</i>	human beings	
<i>-in, -en</i>	small and thin things	
<i>-on (-on, -ɔn)</i>	diverse	
<i>-is</i>	only one noun 'tree'	

Source: Adapted from Carlin (1993)

Beer et al. (2009) record additional low-frequency plural markers, which may be partly due to dialect differences. Ik shows considerable traces of frozen nominal morphology, and it seems likely that proto-Kuliak had a system more like So.

Beer (2017: 84, Table 4.22) presents Nyang'i plural suffixes, distinguishing those which occur only with Kuliak roots and those which occur with Eastern Nilotic roots. The valid Kuliak affixes are given as in Table 5.

Table 5: Kuliak affixes

<i>-ík</i>	<i>-án</i>	<i>-itín</i>	<i>-at</i>
<i>-(u)jek</i>	<i>-is</i>	<i>-ín</i>	<i>-o</i>
<i>-ak</i>	<i>-it</i>	<i>-én</i>	

Nyang'i has a frozen singulative *-at*. The set of *-ík*, *-ín* and *-íník*, and *-it*, *-in* and *-itín* illustrate the stacking of VC suffixes. Beer (2017) gives examples of -s suffixes in some words with epenthetic glides or even the replacement of a singular suffix.

3. *ɲákúkù* *ɲákúkùjés* charcoal
 lòtíbé *lótibàs* net (for animals)

However, the dominant number and gender markers, *ɲa-* and *pa-*, appear to have been taken over wholesale from Karimojong, and so are not useful for reconstructing Kuliak morphology. Comparison with the nominal morphology of

Western Nilotic, as described by Storch (2005), also points to similarities, so contact with Nilotic is clearly also part of the explanation.

The shape of nouns is also surprisingly diverse and probably reflects this complex history of descent and contact. All three documented languages have a distinct set of nouns (and occasional verbs) with the formula VC, shown in Table 6.

Table 6: Kuliak VC roots

Gloss	Ik	So	Nyangi
animal	<i>ínw</i>		
ashes		<i>uk</i>	<i>uk^w</i>
black		<i>im</i>	<i>im</i>
bone	<i>ɔk^a</i>	<i>ɔk</i>	<i>ɔk</i>
bottom	<i>óz</i>		
carry on back	<i>ed</i>	<i>ed</i>	
chew, eat hard foods	<i>ats'</i>	<i>aɕaɕ</i>	<i>aɕ</i>
child, son	<i>im</i>		<i>himɪ</i>
come	<i>ats</i>	<i>aɸ</i>	<i>aɸ</i>
current, flow, flood	<i>ísw</i>		
drunkenness	<i>és</i>		
excrement, faeces	<i>ets'</i>	<i>ij</i>	<i>ij</i>
eye, seed	<i>ekw</i>	<i>εk</i>	<i>εkw</i>
far	<i>aĕ</i>	<i>ag</i>	<i>ag</i>
hand		<i>an</i>	<i>an</i>
head	<i>ik</i>	<i>ik</i>	<i>ik</i>
herd		<i>éak</i>	<i>akw</i>
hole		<i>or</i>	<i>or</i>
horn, antenna, big flute, gun	<i>éb</i>	<i>εb</i>	<i>εb</i>
house		<i>ir</i>	<i>ír</i>
in, inside	<i>aĕw</i>	<i>ag</i>	<i>agw</i>
increase	<i>at</i>	<i>éat</i>	
infinitive suffix		<i>-ug</i>	<i>-ug</i>
inner cheek	<i>ɔb</i>		

Table 6: Kuliak VC roots

Gloss	Ik	So	Nyangi
knock		<i>ɪn</i>	<i>ɪn</i>
know	<i>íty-és</i>	<i>es</i>	<i>yes</i>
man, husband	<i>yakw</i>		
meat	<i>em</i>	<i>em</i>	<i>em</i>
migrate		<i>og</i>	<i>og</i>
milk	<i>id</i>	<i>id</i>	<i>id</i>
mouth, hole, den	<i>ak</i>	<i>ak</i>	<i>ak</i>
name	<i>éd</i>		
near		<i>er</i>	<i>er</i>
other		<i>ed</i>	<i>ed</i>
person	<i>ám</i>		
pestle used esp. for white ants	<i>àǝ</i>		
place, homestead, village	<i>aw</i>		
plural suffix	<i>-ik</i>	<i>-ek</i>	<i>-ek</i>
road		<i>od</i>	<i>od</i>
rope	<i>uun</i>		<i>un</i>
seed, grain	<i>ed'</i>		
side, direction	<i>ay</i>		
skin		<i>ar</i>	<i>ar</i>
soft dry grass	<i>úd</i>		
sore, wound	<i>ǝj^a</i>	<i>ɔj</i>	<i>ɔj</i>
strangle	<i>ik</i>	<i>iket</i>	<i>ik</i>
swell	<i>em</i>	<i>em</i>	<i>em</i>
sycamore fig	<i>áts'</i>		
termite sp. outside their hill	<i>es</i>		
thigh	<i>ob</i>		<i>ob</i>
thorn		<i>as</i>	<i>as</i>
three	<i>ad^c</i>	<i>ɔn</i>	<i>ɔn</i>

Table 6: Kuliak VC roots

Gloss	Ik	So	Nyangi
tongue		<i>ɛdeɓ</i>	<i>ɛd</i>
tree		<i>ad</i>	<i>ad</i>
vomit	<i>ɛn</i>	<i>ɛn</i>	<i>ɛn</i>
what?	<i>is</i>		

Although containing many common lexical items, these constitute only a small subset of the overall vocabulary. Nouns beginning with V, usually with the formula VCV(C), are also quite common, but CVC(V) nouns predominate. The VC shape is relatively rare in Nilo-Saharan, and uncommon in Africa as a whole. So it seems worthwhile asking how it has arisen. As Section 4 will demonstrate, many of these items can be linked to a CV formula elsewhere in Nilo-Saharan, and it is possible that this was a regular process in the period when proto-Kuliak was evolving.

The data sources are as follows. Ik is cited from the dictionary and grammar compiled by Schrock (2017). So is cited either from the dictionary of So (Carlin ms.), which was revised by the present author. However, Samuel Beer (p.c.) kindly supplied the author with a spreadsheet of his field data on So and Nyan'gi, and these are cited where appropriate. The proto-Kuliak forms are from Heine (1976). Comparative Nilo-Saharan language data is from a database compiled by the present author. All forms are given appropriate references to the source.

4 DATA PRESENTATION AND ANALYSIS

3.1 Tables illustrating segment reversal

The following tables present comparisons between Kuliak languages and other branches of Nilo-Saharan, where there is evidence for segment reversal. They include three levels of the classification: the attested form, the gloss in the source material and an abbreviation for the source itself. The abbreviations refer to references which may not be cited in the text. I have included a quasi-reconstruction, marked #, for Nilo-Saharan, where I think this can be justified by the data, but this should be treated as a placeholder for a full reconstruction. Sometimes the lexical items have been discussed in syntheses such as Greenberg (1963) and Ehret (2001). I have abbreviated these in the references below each table where relevant.

Table 7: Kuliak ‘tree’, [#da], in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		So	<i>ad pl. ed-s</i>	tree, shrub	HC
Kuliak		Ik	<i>da.k^wa</i>	tree	Sc17
Koman		Opo	<i>t^ya</i>	tree	Be83
Gumuz		Gumuz	<i>ǰá</i>	tree	Ah12
Kunama		Kunama	<i>è’là</i>	tree	Be01
ES	Daju	Shatt	<i>è(e)t</i>	tree	Bo08
Maban		Maba	<i>dáá</i>	wood beam	Ed91
Saharan	East	Sagato	<i>dā</i>	wood	Pe87

This root is attested as far as Saharan, and both So and Shatt show segment reversal. However, Ik appears to retain the original CV ordering. Cushitic languages have ‘əḏ, which may be related. (Refs: Bender 1991: 82)

Table 8: Kuliak ‘eat’ [#ja] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>ats’-es</i>	bite, chew, eat hard food	Sc17
Koman		Proto-Koman	<i>*ǰa</i>	eat	Ot19
Gumuz		Guba	<i>sa</i>	eat	Ah04
ES	Surmic	Mursi	<i>usa</i>	eat	TYO08
ES	Daju	Shatt	<i>sia</i>	eat	Bo11
ES		Meroitic	<i>sín</i>	eat	Ri09
Furan		Fur	<i>ǰàssì</i>	to bite	Wa10
CS		Gula Mere	<i>ùsà</i>	<i>manger (dur)</i>	Bo00
CS		Bagirmi	<i>sà</i>	eat	RCS
Saharan		Beria	<i>sie</i>	eat	JC04

This is one of the best roots illustrating the unity of the Nilo-Saharan phylum and is attested everywhere. (Ref: Ehret 2001: 387, 518)

Table 9: Kuliak ‘head’ [#kule] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Proto-Kuliak	<i>*ik</i>	head	He76
Chabu ⁴		Chabu	<i>koy</i>	head	Ki15
Koman		Proto-Koman	<i>*kʷp</i>	head	Ot19
Gumuz		CG	<i>*kʷa</i>	head	Ah04
Bertha		Bertha	<i>agur</i>	king	B-G07
ES	E Nilotic	Turkana	<i>akou</i>	head	Oh89
ES	E Nilotic	Bari	<i>k-we</i>	head	Vo82
ES		Nara	<i>kele</i>	head	Ha00
ES		Meroitic	<i>kʷur</i>	<i>souverain</i>	Ri09
Kadu		Krongo	<i>kwaara</i>	chief	RCS
Furan		Amdang	<i>kuyɛ</i>	<i>tête</i>	Wo10
Maban		Masalit	<i>kuron</i>	chief	Ed91
Saharan		Kanuri	<i>kə̀lâ</i>	head	Cy94

The original root may have been something like *#kule*, to account for the combinations of front and back vowels that persist throughout Nilo-Saharan. Kuliak seems to have first lost the medial segments and then reversed those remaining. The epenthetic (ʷ) which surfaces in lk (*ikʷ*) is presumably the trace of this process. South Nilotic has innovated with **met* for ‘head’ (Rottland 1982), so this cannot be an influence on Kuliak. (Refs: Bender (1997: 79); Rottland (1982:26))

⁴ Chabu is also known as Shabo.

Table 10: Kuliak ‘bone’ [#k^wa] in Nilo-Saharan context

Family	Group	Language	Attestation	Gloss	Source
Kuliak		Ik	*ɔk ^a	bone	Sc17
Kuliak		Nyang’i	ok	bone	Be13
Gumuz		Guba	ʒik ^w a	bone	Ah04
Bertha		Mayu	k’aara	bone	B-G07
ES	Nilotic	PN	*kăw	bone	Di88
Kadu		Katcha	kûbà	bone	RCS
Maban		Maba	kàŋjí-k	bone	Ed91
CS		MMD	k ^w a	bone	WB99
CS	LN	Lendu	kpa	os	CKL
CS		Birri	kpo	bone	Sa50
CS	SBB	Sar	kəŋgā	os	Bo00

Only Kuliak seems to have undergone segment reversal.

Table 11: Kuliak ‘road’ [#doCV] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		So	od’	road, path, way	HC
Kuliak		Nyang’i	hód	road	Be13
Koman		Gule	adon	road	Ot19
Gumuz		Guba	ɲdoa	road	Ah04
ES	E Jebel	Gaam	teed	road	Be98
ES	Nilotic	Dinka	dhöl	road	
ES	Nubian	Birgid	tondi	road	Be06
ES	Tama	Tama	tár	road	Ed91b
Furan		Fur	d-ɔrá	road	Wa10
CS		Kenga	dóóbò	chemin	Pa04
CS		Jur Beli	te	path	
Saharan		Daza	tɔrɔɔ	chemin	HW05

The original form of this root must have been something like #dona, with the second consonant of the root realised as *n*/*l*/*r* in different languages. Evidence that the

original *d-* was implosive, as in So, is also attested in Central Sudanic. So and Nyang'i have deleted the second syllable before inverting the root, as with 'bone'. (Ref: Greenberg (1963: 144))

Table 12: Kuliak 'excrement' [#ifi] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Source
Kuliak		Ik	<i>ets</i> ^{2a}	Sc17
Kuliak		So	<i>ij</i>	HC
ES		Nara	<i>if</i>	Be68
ES	Nilotic	Ongamo	<i>na-ɸifi</i>	VH89
ES	Taman	Sungor	<i>ifi</i>	ED91b
CS		Bulala	<i>isi</i>	Bo00
CS		Bongo	<i>ifi</i>	Bo00

The original Nilo-Saharan root seems to have been something like *#ifi* and Kuliak, together with Nara, has deleted the second vowel of the root, thus giving the appearance of metathesis.

Table 13: Kuliak 'person, man' [#kaNa] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>yak</i> ^w	man, husband	Sch17
Koman		Proto-Koman	<i>*g(w)às'</i>	man	Ot19
Kunama		Kunama	<i>ka</i>	man	RCS
Kunama		Ilit	<i>kaad-a</i>	man	RCS
ES	Nara	Nara	<i>kúú</i>	man	Ha00
ES	Daju		<i>kaŋgi</i>	person	Th81
ES	Ama	Ama	<i>kwây</i>	man	Ki96
Maban		Maba	<i>kàŋ</i>	person	Ed91a
Maban		Masalit	<i>kamba</i>	person	Ed91a
Fur		Fur	<i>kwa</i>	people	Wa10
Saharan	West	Kanuri	<i>kâm, kwâ</i>	man	Cy94

There is plausible evidence for a nasal, perhaps a velar nasal, in C₂ position. Daju and Maba both attest this directly, while Masalit and Kanuri have the bilabial nasal

-m- in this position. Nara vowels are unexpected and this may be a coincidental resemblance.

Table 14: Kuliak ‘male’ [#maCa] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>ám</i>	person	Sc17
ES	Surmic	Murle	<i>máatf</i>	male	Yi01
ES	Surmic	Majang	<i>maɲa</i>	elder brother	Yi01
ES	Nubian	Old Nubian	<i>mete</i>	generation	Br96
ES		Meroitic	<i>maçe</i>	<i>enfant, fils</i>	Ri09
ES	Tama	Tama	<i>máata</i>	boy	Ed91b
Maban		Maba	<i>mafuk</i>	husband	Ed91a
CS	MM	Madi	<i>màdī</i>	person	BI00
CS	MM	Logo Bari	<i>māqí</i>	person	WB99
CS	ME	Mvuba	<i>ímá</i>	<i>mère</i>	DD
CS		Birri	<i>ama</i>	female (?)	Sa50
CS	SBB	Yulu	<i>mêêcē</i>	<i>beau-parent</i>	Bo00
CS	SBB	Bongo	<i>máaʹ</i>	<i>enfant;</i> <i>neveu</i>	Bo00
Saharan	East	Beria	<i>màmâ</i>	<i>oncle</i> <i>maternel</i>	JC04

East and Central Sudanic suggest a dental in C₂ position, although this is lost elsewhere. Two branches of Central Sudanic have *d/q* while Eastern Sudanic has -*t*- in Old Nubian and Tama. Meroitic and Murle have *tʃ/ɕ* which are probably part of the same set.

Table 15: Kuliak ‘to pour’ [#tVC-] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>ot-és</i>	to pour	Sc17
Kuliak		So	<i>or-a</i>	to pour in	HC
Koman		Proto-Koman	<i>*tʰír</i>	to pour	Ot19
Kunama		Kunama	<i>‘todà</i>	to pour out water	Be01
Maba		Aiki	<i>tend /te</i>	verser	No89
CS	MM	Maḏi	<i>sò pl. tū</i>	to pour	BW99
Saharan		Kanuri	<i>tá(b)-</i>	to pour	Cy94

The evidence for *d/r* in C₂ position is not strong and should only be considered a possibility.

Table 16: Kuliak ‘lie down’ [#be] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>èp-ôn</i>	sleep	Sc17
Gumuz			<i>ampé?</i>	lie down	Ah04
Kunama			<i>abe</i>	sleep	Be01
ES	Nubian	Kenzi	<i>bu</i>	sleep	
ES	Tama	Merarit	<i>abney</i>	sleep	Ed91b
Maban		Maba	<i>bí</i>	sleep	Ed91a
CS	ME	Efe	<i>àbō</i>	dormir	DD
CS	KA	Kresh	<i>ḡíḡí</i>	dormir	Bo00
CS	SBB	Mbay	<i>bí</i>	lie down	Bo00
Saharan		Kanuri	<i>bo</i>	sleep	Cy94

Some branches of Nilo-Saharan show alternations with mid and high back vowels.

Table 17: Kuliak ‘three’ [#ta] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Source
Kuliak		lk	<i>ad</i>	Sc17
Berta		Malkan	<i>odo</i>	Be89
ES	Nilotic	Mayak	<i>dók</i>	A99
ES	Nubian	Midob	<i>táasi</i>	We93
ES	Temein	Temein	<i>kwóťaná?</i>	RCS
ES		Gaam	<i>ótó</i>	Be98
Kadu		Keiga	<i>qóóná</i>	Sch94

There is no evidence for a consistent second syllable in this example.

Table 18: Kuliak ‘man, male’ [#bor/IV] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		lk	<i>ám pl. róḅ</i>	person	Sc17
ES	Surmic	Didinga	<i>boro</i>	man	Yi01
ES	Surmic	Me’en	<i>bole</i>	boy	Yi01
ES	Meroitic	Meroitic	<i>abara</i>	<i>homme</i>	Ri09
Kadu		Krongo	<i>bala</i>	man	RCS
Mabaan		Maba	<i>mbara</i>	brother	Ed91a
Fur		Fur	<i>bara</i>	brother	Wa10
CS	MM	Madi	<i>bá</i>	man	BI00
CS	KA	Kresh	<i>belu</i>	man	Bo00
Saharan	East	Beria	<i>bòrū</i>	<i>homme, mari</i>	JC04
Songhay	South	Zarma	<i>bòró</i>	<i>personne</i>	BW94

This example is not exactly the same as the others listed here, as it is a true metathesis, where a CVC segment swaps consonants; in this case Nilo-Saharan *bVr*- becomes Kuliak *rVḅ*-. This gloss is one of the most convincing pieces of evidence for the unity of the Nilo-Saharan phylum.

3.2 VC nominal and verbal affixes

The common number markers in Kuliak also appear to undergo segment reversal. Kuliak languages have a reconstructed singulative in *-at*, which corresponds to *ta-*

in Eastern Sudanic and Kadu. Ik has *-ɪt* and So *-at*, hence the reconstruction. There is also a plural marker *-Vk*, which is the same as the *kV-* affix attested elsewhere. Table 19 shows Temein plurals which either copy the affix and then lose the final *-V*, giving the appearance of a *Vk-* marker, or simply prefix a *kV-* to the root (Blench 2013). The citations of plurals mark the *k(V)-* prefixes.

Table 19: Temein plurals showing *-k-* affixes

Gloss	Unmarked	Plural
belly	<i>óòm</i>	<i>k-ómík</i>
big	<i>ínbù</i>	<i>kɪ-mbík</i>
hill, stone	<i>kúɾɛʔ</i>	<i>ku-kúɾɛʔ</i>
shield	<i>wór</i>	<i>k-wòráʔ</i>

The Kadu languages all have singulatives in *tV-* where the vowel shows harmony with the root vowels of the stem. Table 20 shows some examples from Katcha, taken from Gilley (2013).

Table 20: Katcha singulatives showing *-t(V)-* prefixes

Gloss	Singulative	Plural
side of body	<i>t-ukulé</i>	<i>ukulé</i>
lion	<i>t-akaamu</i>	<i>akaamu</i>
unripe seed	<i>ti-kiréérébé</i>	<i>kiréérébé</i>
k.o. grass	<i>ta-malaaya</i>	<i>malaaya</i>

Bender (1997) gives numerous further examples of the ‘moveable’ affixes of Nilo-Saharan, which are not always number markers and may originally have been determiners. The process whereby they are copied from prefix to suffix and lose the final *-V* gives an initial appearance of a *-Vk* suffix and Kuliak probably represents a case where these have ceased to become productive, i.e. moveable. Almost certainly the *-Vn* suffix in So can be compared to the *nV-* affixes attested elsewhere in Nilo-Saharan.

3.3 Examples where segment reversal is also attested elsewhere

The tables in Section 4.1 give occasional examples of where Kuliak segment reversal is attested elsewhere in Nilo-Saharan, but there are a few glosses where VC structures are usual throughout. The tables below give some examples of these:

Table 21: Kuliak segment reversal attested elsewhere - ‘milk’

Family	Subgroup	Language	Attestation	Gloss	Source
Bertha			<i>irr</i>	milk, breast	B-G07
Kuliak		Proto-Kuliak	<i>*id</i>	milk	He76
Kuliak		Ik	<i>íd^wâ</i>	milk	Sc17
ES	E Jebel	Aka	<i>eerí</i>	milk	Be98
ES	Surmic	Mursi	<i>úrò</i>	milk	Yi01
ES	Surmic	Majang	<i>il</i>	human milk	Yi01
ES	Nubian	Kenzi	<i>erti</i>	breasts	Ho86
ES		Meroitic	<i>ira</i>	<i>lait</i>	Ri09
ES	Nyimang	Ama	<i>èlò</i>	milk	Ki96
ES	Daju	Proto-Daju	<i>-idi-</i>	breast	Th81

Unlike the remaining roots discussed here, the VC form is widespread in Eastern Sudanic and in neighbouring languages, including Chabu but is lost in Nilo-Saharan branches further west.

Table 22: Kuliak segment reversal attested elsewhere - ‘ashes’

Group	Subgroup	Language	Attestation	Gloss	Source
Kuliak		So	<i>uk</i>	ash	HC
Kuliak		Ik	<i>káw</i>	ashes	Sc17
ES	Surmic	Mursi	<i>bur</i>	ashes	Yi01
ES	Temein	Temein	<i>úluk</i>	ashes	Bl13
CS		Sinyar	<i>kabur</i>	ashes	Ha78
CS	SBB	Modo	<i>bùrúkù</i>	<i>cendres</i>	Bo00
CS	SBB	Yulu	<i>vùkù</i>	<i>feu</i>	Bo87
CS	SBB	Fer	<i>úk</i>	<i>cendres</i>	Bo87

It is assumed the original form was probably three syllables, perhaps similar to modern Modo *bùrúkù*, hence the claim that Mursi is part of the cognate set. The root has eroded along very different pathways in different Nilo-Saharan branches.

Table 23: Kuliak segment reversal attested elsewhere - ‘mouth’

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Proto-Kuliak	<i>*ak</i>	mouth, voice, language	He76
ES		Nara	<i>àwòlà</i>	mouth	Ha00
ES	E Jebel	Gaam	<i>ag</i>	mouth	St
ES	Ama	Ama	<i>ɲàl</i>	mouth	Be00
ES	Ama	Afitti	<i>ɲilà</i>	mouth	Be00
ES	Nubian	Dongola	<i>agil</i>	mouth	Ar65
ES	Nubian	Mahas	<i>ag</i>	mouth	Kh87
ES	Tama	Tama	<i>əwl</i>	mouth	Be97
CS	KA	Kresh	<i>àkpà</i>	<i>bouche</i>	Bo00
CS	SBB	Modo	<i>kpà</i>	<i>bouche</i>	Bo00

The original form may have been similar to Ama *ɲVl*-. The nasal was reduced to -*w*- in Nara and Tama and lost nasality in Dongola Nubian, eroding to *ag* in Mahas. An analogous process took place in Kuliak at the level of the proto-language.

Table 24 presents the root for ‘name’ segment by segment to illustrate how the process of erosion may operate in other less well-attested words.

Table 24: Kuliak segment reversal attested elsewhere, ‘name’

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>é d ì</i>	name	Sc13
Kuliak		Nyang’i	<i>è' d é k</i>	name	Be13
ES		Nara	<i>a d e</i>	name	Be68
ES	Nilotic	Bari	<i>k a r é n</i>	name	Vo82
ES	Temein	Temein	<i>k à l í n</i>	name	Bl13
ES	Nubian	Meidob	<i>[k] ó r í</i>	name	We93
Kadu		Keiga	<i>è r è</i>	name	Sch94
CS	MM	Madi	<i>r ú</i>	name	Bl00
CS	KA	Kresh	<i>d í r í</i>	nom	Bo00
CS	FS	Formona	<i>e r e</i>	name	Ha78
CS	SBB	Bagirmi	<i>r ī</i>	name	Ke16
CS	SBB	Baka	<i>ì r ì</i>	nom	Bo00
CS	SBB	Ngambay	<i>r ī</i>	nom	Bo00
Fur		Fur	<i>k a r i o</i>	name	Wa10

A clear example where the underlying root is *Vd/ri* but where a moveable *k*- affix has been added, probably separately in Fur and Eastern Sudanic. Proto-Kuliak may well also have had a final *-k*, to judge from the Nyang’i evidence.

Table 25: Kuliak segment reversal attested elsewhere - ‘horn’

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	<i>eb</i>	horn	He99
Kuliak		Nyang’i	<i>eb'ek</i>	horn	Be13
Koman		Kwama	<i>*kwap</i>	horn	Ot19
ES	Surmic	Majang	<i>kulbe</i>	horn	Yi01
ES	W Nilotic	Lango	<i>ip</i>	horn	
ES	Nubian	Dilling	<i>eb</i>	horn	
Furan		Fur	<i>kòlbá</i>	horn	AJ
Furan		Amdang	<i>k^hɛlfī</i>	corne	Wo10

It is not certain the *kVb*- forms are cognate with the *Vb* set in Kuliak and Eastern Sudanic. However, in the light of the Nilo-Saharan moveable affix *k*- (see above), it is assumed they are part of the same set.

Table 26: Kuliak ‘to say’ [#taN-] in Nilo-Saharan context

Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		So	<i>at</i>	say	HC
Koman		Opo	<i>tan</i>	say	Be83
Koman		Gwama	<i>t’wa?at’wa</i>	tell	KR11
ES	Surmic	Majang	<i>tunɔŋ</i>	say	Jo07
ES	Ama	Ama	<i>tánde</i>	talk	Ki96
ES	Taman	Ibiri	<i>táa nì</i>	speak, talk	Ed91b
Kadu		Talasa	<i>aḍééma</i>	speak	Sch94
Furan		Amdang	<i>ʔulduŋu</i>	<i>dire</i>	Wo10
Maban		Aiki	<i>nden</i>	<i>parler, dire</i>	No89
CS	MM	Logo	<i>tá</i>	say	WB99
CS	KA	Kresh	<i>àdè</i>	<i>dire</i>	Bo00
CS	FS	Formona	<i>adama</i>	say	Ha78

This is not conclusive, since other branches of Nilo-Saharan have examples of segment reversal, e.g., Central Sudanic and Kadu.

4. POSSIBLE PATHWAYS

The data tables present evidence that segment reversal is a feature of Kuliak languages, frequently in contrast with the remainder of the Nilo-Saharan languages. It is not synchronically restricted to any particular part of speech, occurring at least in nouns, verbs and numerals. I argue it is distinct from metathesis as defined elsewhere, since it is not a phonological process that involves the reversal of a restricted set of consonants, as between Anglo-Saxon and modern English, nor is there evidence that it arises from a grammatical function. Thompson and Thompson (1969) discuss the use of metathesis as a grammatical procedure, which *is* attested in Nilo-Saharan. In Fur, when a CV verb root is prefixed by consonantal person (Cp) marker it becomes VC (Jakobi 1989). Thus:

4.	Root	With marker
'drink'	<i>ba-</i>	<i>Cp + ab-</i>

This process is applied to verbs in Fur, but it is easy to imagine it could be extended to other parts of speech if some similar prefix is required.

However, in Kuliak there is no evidence for a regular process, as many CV verb roots do not undergo reversal. The reversal occurs at the interface between morphology and phonology, through processes of segment erosion which are attested in other branches of Nilo-Saharan. A number of pathways could be suggested at this point, but affix copying, subsequent partial erosion and then regularisation across the system is one possibility. The hypothesis is that this arises from the convergence of two processes, affix copying of common elements (-*k*- and -*t*-) and erosion from the front, leading to a wide diversity of synchronic forms (e.g., the Temein and Katcha examples in Tables 19 and 20). Table 27 sets out a plausible pathway beginning with a CVCV root, which is eventually realised as VC in Kuliak.

Table 27: Pathway from CVCV root to VC in Kuliak

Root	+	Suffix	→	Prefix	Root	Suffix	→	Prefix	+	Root
CV	+	CV	→	CV	CV	CV	→	CV	+	CV
→	Prefix	Root	→	Prefix	Root					
→	V	CV	→	V	C					

However, the data also show that similar outcomes can occur elsewhere, and in the case of a word like 'milk' (Table 21), a VC order is dominant across most Nilo-Saharan branches. These forms may arise from a common process of C₁ deletion and may not be examples of reversal, though they are clearly related.

6. CONCLUSION

The paper demonstrates that segment reversal is widespread in the Kuliak branch of Nilo-Saharan although it is only sporadically attested elsewhere in the phylum. Fresh data on several Kuliak languages has become available in recent years, and this has provided an opportunity both to expand the reconstruction of its lexicon and to re-evaluate the evolution of its morphology. The next step is thus a new reconstruction of proto-Kuliak, in particular exploring the evolution of its morphology. This would enable more systematic comparison with the closest branches of Nilo-Saharan, in particular Eastern Sudanic.

Scepticism concerning the structure of the Nilo-Saharan phylum remains prevalent due to the divergence between its branches. However, this type of widespread pattern can be tied to particular segments, but should prove

reconstructible, as it is clearly not merely typological. This expands the range of arguments for the coherence of the phylum.

REFERENCES⁵

- Ahland, Colleen A. 2004. *Linguistic Variation within Gumuz: A Study of the Relationship between Historical Change and Intelligibility*. MA Thesis, University of Texas at Arlington. [Ah04]
- Ahland, Colleen A. 2012. *A Grammar of Northern and Southern Gumuz*. PhD Thesis, University of Oregon. [Ah12]
- Andersen, Torben M. 1999. "Vowel harmony and vowel alternation in Mayak (Western Nilotic)". *Studies in African Linguistics*, 28: 1-29. [A99]
- Armbruster, Charles Hubert 1965. *Dongolese Nubian. A Lexicon*. Cambridge: Cambridge University Press. [Ar65]
- Beer, Sam J. 2013. "Comparative Nyang'i Wordlist". Unpublished Spreadsheet. [Be13].
- Beer, Sam, J. 2017. *Grammatical Contraction in Nyang'i: A Descriptive and Comparative Study*. PhD Thesis, University of Colorado at Boulder.
- Beer, Sam, J., Amber McKinney and Lokiru Kosma. 2009. "The So language: A grammar sketch". Manuscript available from the author.
- Beer, Sam J., Andrew Harvey, Maarten Mous, Christian J. Rapold, Terrill Schrock and Ahmed Sosal. n.d. "Lateral obstruents in East Africa from an areal and historical perspective: A case for contact-induced non-change". Manuscript available from the author.
- Bell, Herman. 2006. "Birgid Nubian: Recording a nearly extinct language". In Doris L. Payne and Mechthild Reh (eds.), *Insights into Nilo-Saharan Languages, History and Cultures*, 75-83. Köln: Rüdiger Köppe.
- Bender, M. Lionel. 1968. "Analysis of a Barya word list". *Anthropological Linguistics*, 10(9): 1-24. [Be68]
- Bender, M. Lionel 1989. "Berta Lexicon". In M. Lionel Bender (ed.), *Topics in Nilo-Saharan*, 271-304. Hamburg: Helmut Buske. [Be89]
- Bender, M. Lionel 1997. *The Nilo-Saharan Languages: A Comparative Essay*. 2nd ed. München: LINCOM Europa.
- Bender, M. Lionel 1998. "The Eastern Jebel languages of Sudan. II. Comparative lexicon". *Afrika und Übersee*, 81(1): 39-64.
- Bender, M. Lionel 2001. "English-Kunama lexicon". *Afrikanistische Arbeitspapiere*, 65: 201-253. [Be01]
- Benishangul-Gumuz Language Development Project. 2007. *Bertha-English-Amharic Dictionary*. Assosa: Education Bureau/ Addis Ababa: SIL. [B-G07]

⁵ This list of references includes all the citations given in the "Source" column in the data tables. Thus, Ahland (2004) does not appear in the text, but in the source column as [Ah04].

- Bernard, Yves and Mary White-Kaba. 1994. *Dictionnaire zarma-français (République du Niger)*. Paris: Agence de coopération culturelle et technique.
- Blackings, Maire J. 2000. *Ma'di English – English Ma'di Dictionary*. München: Lincom Europa.
- Blench, Roger M. 2013. "The Temein languages". In Thilo Schadeberg and Roger Blench (eds.), *Nuba Mountain Language Studies*, 485-500. Köln: Rudiger Köppe. [Bl13]
- Boyeldieu, Pascal. 1987. *Les langues fer ("kara") et yulu du Nord Centrafricain: esquisses descriptives et lexiques*. Paris: Geuthner. [Bo87]
- Boyeldieu, Pascale. 2011. "The modified form of Shatt Damam nouns and its Daju cognates". *Afrika und Übersee*, 91: 9-84. [Bo11]
- Browne, Gerald M. 1996. "Old Nubian dictionary". *Corpus Scriptorum Christianorum Orientalium*, 562. Leuven: Peeters.
- Carlin, Eithne. 1993. *The So Language*. (Afrikanistische Monographien 2). Köln: Universität zu Köln.
- Crazzolaro, Father J.P. 1967. "Ik grammar". Unpublished Manuscript.
- Cyffer, Norbert. 1994. *English-Kanuri Dictionary*. Köln: Rudiger Köppe.
- Dimmendaal, Gerrit J. 1988. "The lexical reconstruction of Proto-Nilotic: A first reconnaissance". *Afrikanische Arbeitspapiere*, 16: 5-67.
- Dimmendaal, Gerrit J. 2001. "Language shift and morphological convergence in the Nilotic area". *Sprache und Geschichte in Afrika*, 16/17: 83-124.
- Driberg, J.H. 1932. "Lotuko dialects". *American Anthropologist*, 34(4): 601-609.
- Edgar, John T. 1991a. *Maba-group Lexicon*. Berlin: Reimer. [Ed91]
- Edgar, John T. 1991b. "First steps toward Proto-Tama". In M. Lionel Bender (ed.), *Proceedings of the Fourth Nilo-Saharan Conference*, Bayreuth 30 Sept.-2 Oct., 1989, 111-131. Hamburg: Buske.
- Ehret, Christopher. 1981a. "Revising Proto-Kuliak". *Afrika und Übersee*, 64: 81-100.
- Ehret, Christopher. 1981b. "The classification of Kuliak". In Thilo C. Schadeberg and Marvin L. Bender (eds.), *Nilo-Saharan*, 269-290. Holland: Foris.
- Ehret, Christopher. 2001. *A Historical-Comparative Reconstruction of Nilo-Saharan*. Köln: Rudiger Köppe. [E]
- Fleming, Harold C. 1983. "Kuliak external relations: step one". In Rainer Vossen and M. Bechhaus-Gerst (eds.), *Proceedings of the International Symposium on Languages and History of the Nilotic Peoples*, Cologne, January 4-6, 1982, 423-478. Berlin: Dietrich Reimer.
- Gilley, Leoma. 2013. "Katcha noun plurals". In Thilo Schadeberg and Roger Blench (eds.), *Nuba Mountain Language Studies*, 501-522. Köln: Rudiger Köppe.
- Greenberg, Joseph H. 1950. "The Eastern Sudanic Family". *Southwestern Journal of Anthropology*, 6(2): 143-160.
- Greenberg, Joseph H. 1955. *Studies in African Linguistic Classification*. Branford, Ct.: Compass.

- Greenberg, Joseph H. 1963. *Languages of Africa*. (Indiana University Research Center in Anthropology, Folklore, and Linguistics, 25). The Hague: Mouton & Co. [G]
- Greenberg, Joseph H. 1971. "Nilo-Saharan and Meroitic". In Jack Berry and Thomas A. Sebeok (eds.), *Sub-Saharan Africa*. [Special issue]. *Current Trends in Linguistics*, 7: 421-442.
- Haaland, Gunnar. 1978. "Ethnic groups and language use in Darfur". In Robin Thelwall (ed.), *Aspects of Language in the Sudan*, 181-199. Ulster: The New University of Ulster. [Ha78]
- Haggag, I. and K. Walters. 2005. *Lexique Tubu (dazaga) -français*. Niamey: SIL.
- Heine, Bernd and Christa König. 1988. *Plants of the So (Uganda)*. Saarbrücken/Fort Lauderdale: Breitenbach Publishers.
- Heine, Bernd and Eithne Carlin. n.d. "So dictionary". Unpublished Manuscript, Köln. [HC]
- Heine, Bernd. 1974/1975. "Tepes and Nyang'i – zwei ostafrikanische Restsprachen [Tepes and Nyang'i – two East African remnant languages]". *Afrika und Übersee*, 58(3/4): 263-300.
- Heine, Bernd. 1975/76. "Ik - eine ostafrikanische Restsprache. Historische Entwicklung und Vokabular [Ik – an East African remnant language. Historical development and vocabulary]". *Afrika und Übersee* 59(1): 31-56.
- Heine, Bernd. 1976. *The Kuliak Languages of Eastern Uganda*. Nairobi: East African Publishing House. [He76]
- Heine, Bernd. 1985. "The Mountain People: some notes on the Ik of north-eastern Uganda". *Africa*, 55(1): 3-16.
- Heine, Bernd. 1990. "The dative in Ik and Kanuri". In William A. Croft, Keith Denning and Suzanne Kemmer (eds.), *Studies in Typology and Diachrony. Papers presented to Joseph H. Greenberg on his 75th birthday*. (Typological Studies in Language, 20), 129-149. Amsterdam and Philadelphia: John Benjamins.
- Heine, Bernd. 1999. *Ik Dictionary*. (Nilo-Saharan - Linguistic Analyses and Documentation, 15). Köln: Rüdiger Köppe.
- Hofmann, Inge. 1986. *Nubisches Wörterverzeichnis. Nubisch-deutsches und deutschnubisches Wörterverzeichnis nach dem Kenzi-Material des Samuël Alî Hisên (1863-1927)*. Berlin: Dietrich Reimer [Ho86]
- Jakobi, Angelika 1989. *A Fur Grammar: Phonology, Morphophonology, and Morphology*. Hamburg: Helmut Buske.
- Jakobi, Angelika and Joachim Crass. 2004. *Grammaire du beria (langue saharienne)*. Köln: Rüdiger Köppe. [JC04]
- Key, T. Hewitt. 1854. "On metathesis". *Transactions of the Philological Society*, 1(11): 206-216. <https://doi.org/10.1111/j.1467-968X.1854.tb00767.x>
- Khalil, Mokhtar M. 1987/88. "Wörterbuch der nubischen Sprache: Fadídja/Mahas-Dialekt [pt. 1]". *Nubica: internationales Jahrbuch für äthiopische, meroitische und nubische Studien*, 1(2): 95-121.

- Kibebe, Tsehay Taye. 2015. *Documentation and Grammatical Description of Chabu*. PhD Thesis, Addis Ababa University. [Ki15]
- Kingston, Abi. 1996. "Ama phonology, grammar sketch, wordlist". Unpublished Manuscript, Khartoum. [Ki96]
- König, Christa. 2002. *Kasus im Ik*. (Nilo-Saharan. Linguistic Analyses and Documentation, 17). Köln: Rüdiger Köppe.
- König, Christa. 2008. *Case in Africa*. Oxford: Oxford University Press.
- Lamberti, Marcello. 1988. *Kuliak and Cushitic: A Comparative Study*. Studia Linguarum Africae Orientalis, 3. Heidelberg: C. Winter.
- Laughlin, Charles D., Jr. 1975. "Lexicostatistics and the mystery of So ethnolinguistic relations". *Anthropological Linguistics*, 17: 325-341.
- Laughlin, Charles D., Jr. and Elizabeth R. Allgeier. 1979. *An Ethnography of the So of Northeastern Uganda*. New Haven: Human Relations Area Files.
- Nougayrol, Pierre. 1989. *La langue des Aiki dits Rounga (Tchad et République Centrafricaine): esquisse descriptive et lexicque*. Paris: Librairie Orientaliste Paul Geuthner pour la Laboratoire de Langues et Civilisations à Tradition Orale (LACITO). [No89]
- Petráček, Karel. 1987. "Berti or Sagato-a (Saharan) Vocabulary". *Afrika und Übersee*, 70: 163-193. [Pe87]
- Rilly, Claude. 2009. *Le méroïtique et sa famille linguistique*. Louvain, Paris and Dudley, MA: Peeters. [Ri09]
- Rottland, Franz. 1982. *Die südnilotischen Sprachen: Beschreibung, Vergleichung und Rekonstruktion*. Berlin: Reimer.
- Rottland, Franz. 1983. "Southern Nilotic (with an outline of Datooga)". In M. Lionel Bender (ed.), *Nilo-Saharan Language Studies*, 208-238. Berlin: Reimer.
- Schadeberg, Thilo C. 1994. "Comparative Kadu wordlists". *Afrikanische Arbeitspapiere*, 40: 11-48. [Sch94]
- Schrock, Terrill B. 2011. *The Phonological Segments and Syllabic Structure of Ik*. SIL Electronic Working Papers 2011-004.
- Schrock, Terrill B. 2015. "On whether 'Dorobo' was a fourth Kuliak language". *Studies in African Linguistics*, 44(2): 48-58.
- Schrock, Terrill B. 2017. *The Ik Language: Dictionary and Grammar Sketch*. Berlin: Language Science Press. [Sc17]
- Serzisko, Fritz. 1987. "The verb 'to say' in Ik". *Afrikanische Arbeitspapiere*, 11:67-91.
- Serzisko, Fritz. 1988. "On bounding in Ik". In Brygida Rudzka-Ostyn (ed.), *Topics in Cognitive Linguistics*, 429-445. Amsterdam and Philadelphia: John Benjamins.
- Serzisko, Fritz. 1989. "The Kuliak languages: a structural comparison". In M. Lionel Bender (ed.), *Topics in Nilo-Saharan Linguistics*, 385-404. Hamburg: Helmut Buske.
- Serzisko, Fritz. 1992. *Sprechhandlungen und Pausen: Diskursorientierte Sprachbeschreibung am Beispiel des Ik*. Linguistische Arbeiten 282. Tübingen: Niemeyer.

- Storch, Anne 2005. *The Noun Morphology of Western Nilotic*. Köln: Rüdiger Köppe.
- Thelwall, Robin, E. W. 1981. *The Daju Language Group. Systematic Phonetics, Lexicostatistics and Lexical Reconstruction*. PhD Thesis, School of Humanities of the New University of Ulster. [Th81]
- Thompson, Laurence C. and M. Terry Thompson. 1969. "Metathesis as a grammatical device". *International Journal of American Linguistics*, 35 (3): 213-219. <https://doi.org/10.1086/465056>
- Tucker, Archibald N. 1971-3. "Notes on Ik". *African Studies*, 30: 341-354, 31: 183-201, 32: 33-48.
- Tucker, Archibald N. and Margaret A. Bryan. 1956. *The Non-Bantu Languages of North-Eastern Africa* (with a Supplement on *The Non-Bantu Languages of Southern Africa* by Ernest O.J. Westphal). London, New York and Cape Town: Oxford University Press for International Africa Institute.
- Turnbull, Colin M. 1967. "The Ik: Alias the Teuso". *Uganda Journal*, 31(1): 63-71.
- Turnbull, Colin M. 1972. *The Mountain People*. New York: Simon & Schuster.
- Voßen, Rainer. 1982. *The Eastern Nilotes: Linguistic and Historical Reconstructions*. Kölner Beiträge zur Afrikanistik, Volume 9. Berlin: Reimer. [Vo82]
- Voßen, Rainer and Bernd Heine. 1989. "The historical reconstruction of Proto-Ongamo-Maa: Phonology and vocabulary". In M. Lionel Bender (ed.), *Topics in Nilo-Saharan Languages*, 181-217. Hamburg: Helmut Buske. [VH89]
- Waag, Christine. 2010. *The Fur Verb and Its Context*. (Nilo-Saharan: Linguistic Analyses and Documentation, 26.) Köln: Rüdiger Köppe.
- Watson, Richard L. and Douglas W. Boone. 1999. *Moru - Ma'di survey report*. SIL Electronic Survey Reports 1999-001. [WB99]
- Wayland, E. J. 1931. "Preliminary studies of the tribes of Karamoja". *Journal of the Royal Anthropological Institute*, 61: 187-230.
- Weatherby, John. 1969. "A preliminary note on the Sorat". *Uganda Journal*, 31(1): 75-78.
- Werner, Roland. 1993. *Tidn-aal: A study of Midob (Darfur-Nubian)*, Berlin: Frankfurter Studien zur Afrikanistik 17. [We93]
- Wiedemann, Sabine and Prossi Nannyombi. 2007. *Ik Language Assessment Report*. SIL Electronic Survey Report 2007-024.
- Wolf, Katharina. 2010. *Une enquête sociolinguistique parmi les Amdang (mimi) du tchad*. Technical report. Ndjamena, Tchad: SIL.
- Yigezu, Moges. 2001. *A Comparative Study of the Phonetics and Phonology of Surmic Languages*. PhD Thesis, Université Libre de Bruxelles. [Yi01]

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