Chapter 26

Stem modification in Nuer

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Nuer is a Western Nilotic language remarkably rich in non-concatenative morphology. This article provides a comprehensive description of those morphological processes in Nuer that are responsible for variations in the form of the stem. Our data shows that all stem-modifying operations have one of the following four targets in the stem: stem vowel quality and quantity, tonal melody, and properties of the stem-final consonant. The vowel quality modification is comprised of two separate processes where either lowering and removal of breathiness is applied or raising and addition of breathiness. Thus, vowel quality modification yields two separate series of mutated vowels. We provide arguments for treating some vowels as basic, while others as derived. We also identify tonal patterns found in verbal morphology, and three types of morphologically triggered consonantal lenition. According to our findings, exactly the same processes apply in both the nominal and the verbal system.

1 Introduction

Nuer is a Western Nilotic language of the Nilo-Saharan language family with almost 900,000 speakers worldwide. It is part of Dinka-Nuer language cluster which also includes Thok Reel.

Nuer has attracted attention for the complexity of its nominal inflection, which employs a baffling variety of forms in a seemingly chaotic lexical and paradigmatic distribution (Frank 1999; Baerman 2012). Table 1 offers a taste of this, showing a small sample of the various schemes of affixation and stem modification

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displayed by different nouns. (All examples in this paper come from our own fieldwork.)

Table 1: A sample set of nominal paradigms (Western variety, Bentiu)

NOM SG	GEN SG	LOC SG	NOM PL	GEN/LOC PL	Gloss
kɛ̀ɛɛt	kɛ̀ɛɛd-ä̰		kɛ̀ɛɛd-ní		'stick'
tê̤r̤	tɛ̰̤r̤-ä̰		tɛ̰t	tɛ̰eet	'hand'
kɔ̰aaaɣ	kɔ̰ah	kɔ̰h	kɔ̰ah	kɔ̰aɣ-nì	'hole'
kíir	kîɛɛɛr	kîiir	kîɛr	kîɛr-ì	'big river'

An obvious requirement for understanding this system is to isolate the morphological devices involved, no mean feat given its high degree of lexical idiosyncrasy. In this paper we set out to do this, focusing on the system (or systems) of stem modification. The key to this lies in verbal morphology, which employs the same devices found in nominal inflection – manipulation of quality, quantity and tone of the stem vowel and manner of articulation of the stem-final consonant – but with a high degree of regularity and predictability. Further, by doing this we can show that there are two distinct kinds of vowel quality modifying processes. One is primarily a lowering process, and is associated with case-number inflection in nouns and person-number inflection in verbs. The other involves vowel raising, and is associated with number inflection in nouns and derivation in verbs.

Language consultants used for this study are all native speakers of Nuer. Of the ten consultants, four are representative of the Western variety of Nuer (Bentiu), and the other six are speakers of the Eastern dialect of Nuer (Jikany[1]). All currently reside outside of South Sudan (UK and USA) but use Nuer on a daily basis within their communities.

The major prior source on Nuer is Crazzolara (1933). Other notable previous works include Vandevort (n.d.)'s draft pedagogical grammar, and Frank (1999) and Storch (2005) on noun morphology. The transcription of data in these sources is often inconsistent, especially in regards to the subtle contrasts of vowel quality

[1]One of our Jikany Nuer consultants spent his formative years in Akobo area of South Sudan; the other five originate from Nasir. The variety of Nuer spoken by the Akobo native does not appear to be different from that spoken by other Jikany Nuer consultants. By contrast, differences between the Eastern (Jikany) and Western (Bentiu) dialects are clearly defined in several areas of grammar. Therefore, we indicate throughout this article whether data comes from Eastern or Western variety of Nuer, without drawing further dialectal distinctions.

and tone. Since much of morphological contrasts in Nuer are signaled by manipulation of precisely these properties, errors in data transcription make it difficult to arrive at phonological operations that are at the heart of Nuer morphology. Before we can truly evaluate the complexity of Nuer verbal and nominal systems, it is essential to establish the basic phonological alternations that play such an important role in Nuer grammar.

More recent work on Nuer includes Gjersøe (2016; 2017) on tone, Reid (forthcoming) on verbal morphology, Faust (2017) on vowel alternations in adjectival reduplication, and Faust & Grossman (2015) which provides general overview of the grammar of a Jikany variety from Nasir. Some of the findings reported here contradict or overlap with the findings in these works. The vowel correspondences are generally aligned with the ones identified by Faust (2017) and Faust & Grossman (2015) but with some important differences mainly involving documentation of breathiness and diphthongization. The tonal inventory that we identify here is richer than the one proposed in Gjersøe (2016; 2017), and it allows for more precise classification of tonal patterns. Where applicable, significant divergences between these works and ours will be pointed out throughout this article.

2 Basics of Nuer phonology

Both varieties of Nuer discussed here distinguish (at least) fifteen vowel phonemes, shown in Figure 1a. Most of these constitute part of a modal/breathy pair (breathiness is indicated by two dots underneath the first grapheme of a vowel). Except for the high mid range, the breathy counterpart is typically somewhat higher in the vowel space. There are also four pairs of modal/breathy diphthongs (Figure 1b). Although we do not indicate it for typographical reasons, non-breathy vowels /i, u/ are [-ATR] while breathy vowels /i̤, ṳ/ are [+ATR]

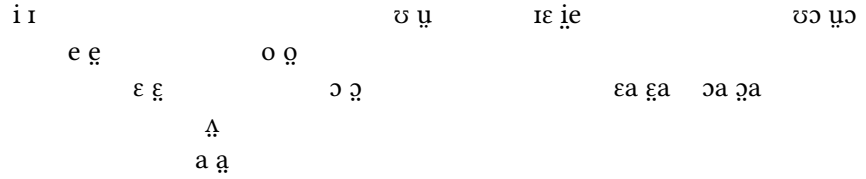

Figure 1: Nuer vowel inventory

Even though the vowels listed in Fig 1 are all contrastive in Nuer, we argue here that they do not all have equal status in Nuer grammar. Only vowels /a, ɔ̰, ɔ, ɛ̰, ɛ, o̰, ḛ, ḭ, i, ṵ, u/ are found in the morphologically "basic" form of the root. All diphthongs, as well as monophthongs /a̰, e, o/, emerge as a result of morphological modification of the stem. These vowels are produced when affixes consisting of floating features superimpose on the vowel of the stem, modifying its properties. Consequently, they signal morphological rather than lexical contrasts.

Both diphthongs and monophthongs occur in three degrees of length: short, long, and overlong, represented here by three vowel graphemes, plus onglide in the case of diphthongs. Breathiness is indicated on the first grapheme alone. There are two lexically specified tones: H and L. Rising and falling tones also occur but their appearance is either phonologically conditioned or results from combination of H and L tones. Falling and high tones are neutralized depending on the phonation of the vowel: if the vowel is breathy, the falling and high tones are both realized as high, while over modal vowels the two tones are both realized as falling. Rising tones emerge as a result of fissure of spread H-tones into L and H (also applies to adjacent H-tones in the same word). In other words, there is a rule HH → LH that takes place word-internally.[2] As with breathiness, tone is indicated on the first grapheme of a multi-graphemic vowel representation.

The consonantal inventory of Nuer is shown in Table 2. In intervocalic position the stem-final consonants tend to become voiced. The phonemes in parenthesis are only contrastive in stem-final position in some varieties of Western Nuer.

3 Verbal inflection

3.1 Overview

We focus here on inflection for subject person-number, which occurs in the Present Imperfect Positive Tense when used with a preverbal subject. A sample paradigm is provided in Table 3, including other forms which we will discuss below only in passing.

[2]Full justification for positing this rule cannot be offered here due to space limitations. One supporting piece of evidence is that before high-toned suffixes, the tone over a short intransitive stem can only be low or rising. At the same time, before low-toned suffixes, the tone of the intransitive stem may be either high or low. This state of affairs can be accounted for assuming that short roots are lexically specified as L or H, and that these lexical tones appear as such before low-toned suffixes. However, before H-toned suffixes the H of the stem breaks into yielding a rising tone. Such analysis also allows for a better understanding of derivation of tonal melodies in transitive stems in §3.3.

Table 2: Consonantal phonemes

	Labial	Dental	Alveolar	Palatal	Velar
Voiceless stops	p	t̪	t	c	k
Voiced stops	b	d̪	d	ɟ	g
Fricative	(f)	(θ)	(r̥)	(ç)	(h)
Nasal	m	n̪	n	ɲ	ŋ
Lateral			l		
Trill			r		
Glides	w			j	ɣ

Table 3: 'beat (the drum).TR'

	Singular	Plural	Other forms
1	pɔ̤aaad-ä̤	pɔ̆aɻ-kɔ̆	NF1 pɔ̤ɻ
1+2(incl)		pɔ̆aɻ-nɛ̂	
2	pɔ̤ɔɔd-ì̤	pɔ̆aɻ-ɛ̂	NF2 pɔ́t
3	pɔ̤ɔɔd-è	pɔ̆aɻ-kɛ̂	NSF pɔ́t

(Western Nuer). NF1 = non-finite form used with perfect auxiliaries; NF2 = non-finite form used with a present negative auxiliary; NSF = non-suffixed form used with a post-verbal suffix.

Besides bearing different inflectional suffixes, the individual forms are distinguished by various stem alternations[3], involving length, vowel quality, tone, and the stem-final consonant. In the next several sections we review these processes in turn.

3.2 Vowel quality modification

The system of vowel quality modification involves a two-way contrast which we designate here as Grade 1 vs. 2/A vs. B (Table 4). The system of vowel grades adopted here is almost identical to the one presented by Reid & Baerman (2017).

[3]The term "stem" is used here to label the portion of the word with the exclusion of inflectional suffixes. Since there are no segmental derivational suffixes, the stem incorporates all derivational morphology.

Table 4: Morphological stem vowel grades in Nuer

Grade 1		Grade 2	
Grade A	Grade B	Grade A	Grade B
i	iɛ	i̤	i̤e
ɛ	ɛa	ɛ̤	e
–	–	ɛ̤	ɛ̤a
a	a	a̤	a̤
ɔ	ɔa	ɔ̤	o
–	–	ɔ̤	ɔ̤a
u	uɔ	ṳ	ṳɔ

The grades correspond to phonological contrasts. Thus most Grade 1 vowels are modal, while Grade 2 vowels are breathy, and raised with respect to their Grade 1 counterparts. The Grade A~B alternation for most vowels involves lowering which, wherever possible, yields an opening diphthong; however, in case of the Grade A vowels /e̤/ and /o̤/ we see instead the removal of breathiness to yield Grade B.[4]

The two sets of alternations have a clear division of labor in the verbal system. Grade 1 vowels are found in underived verbs, while Grade 2 vowels are found with many derived verbal categories. The Grade A~B alternation takes place *within* the paradigms of individual verbal lexemes, e.g. between different subject person-number values. The distribution of Grade A and B differs depending on whether the verb is transitive or intransitive: Grade A is used in 2/3SG of all verbs, and additionally in 3PL of intransitive verbs, while Grade B is used elsewhere.[5] The basic template of the two vowel quality modification types is illustrated in Table 5 and exemplified in Table 6.

The motivation for treating the Grade 1A as the "basic" grade from which all others can be derived, will be given in §6, after the distribution of vowel grades in the nominal and verbal morphology of Nuer has been fully described.

[4]Faust (2017) offers a similar model of inflectional vowel mutation (i.e. derivation of set B from set A in our terms) based on the pattern observed in adjectives, but with two important differences. First, he does not transcribe the diphthong /ɛa/ (which may be valid for his consultant's dialect), positing that the modified counterpart of /ɛ/ is /a/. Most importantly, Faust's does not distinguish various phonation properties in his transcription. As a result, in his model, close mid vowels /e/ and /o/ have no modified counterparts.

[5]This excludes a relatively small class of intransitive verbs which denote involuntary and reflexive actions and states, such as "get tired", "cough", "boil", "float", "be alive", "wash oneself", etc. These verbs have vowels of Grade B in all forms, including the non-suffixed forms.

Table 5: Distribution of Grades A~B in inflected verbal forms

(a) Transitive verb

	singular	plural
1		
2	Grade A	Grade B
3		

(b) Intransitive verb

	singular	plural
1		
2	Grade A	Grade B
3		

Table 6: Exemplification of the patterns in Table 5

	singular	plural		singular	plural
1	nêaaanə̰̀	nĕankɔ̂	1	nĕnə̰́	nĕnkɔ̂
1+2 (incl)		nĕanê	1+2		nĕnê
2	nêɛɛnə̰̀	nĕanê	2	nə̰̆nə̰́	nĕnê
3	nêɛɛnɛ̀	nĕankê	3	nə̰̆nê	nə̰̆nkê

3.3 Other types of stem modification

Variations in vowel quantity, tone and properties of the stem-final consonant are also involved in inflectional morphology. Within the finite paradigm they oppose singular and plural forms, and thus cross-cut the vowel quality alternations described above. Typically only underived transitive verbs are affected. We divide these into two classes, relevant both for tone and vowel quantity alternations.

Let us first look at tone.[6] Class I verbs have a rising contour in the singular, followed by a high tone of the suffix (falling if the vowel of the suffix is modal), and low stem with a low suffix in the plural.[7] Class II verbs have a falling tone (if the stem vowel is modal) or high (if the stem vowel is breathy) tone on the stem followed by the low tone on the suffix in singular forms, and a rise on the stem followed by the fall on the suffix in plural forms. These patterns are summarized in Table 7, abstracting away from the differences in realization of high and falling tones due to the vowel phonation properties. The longer singular stem is represented as having two tonal elements (a spread H-tone in case of Class

[6] The treatment of tone in the verbal system presented in Sections 3 and 4 differs significantly from Gjersøe (2017) who reports only two tonal contours in verbs, and does not distinguish contrast between low and rising tones.

[7] The tone of the 1pl inclusive form will be ignored throughout the discussion, since it has the same tonal contour for all verbs H-H (realized as LH-HL).

Table 7: Tonal patterns in underived transitive verbs

	Singular	Plural	Example		Gloss
			2SG	2PL	
Class I	HH-H → LH-H	L-L	bŭ̱uulɪ̱́	bɔ̱̀lɛ̀	'roast'
Class II	HL-L	H-H → LH-H	nêɛɛnɪ̱̀	nɛ̆anɛ̂	'see'

I, shown as HH, and an HL in case of Class II), while the short plural stem has a single tonal element. The tone of the inflectional suffix is always the same as the last tonal element of the stem and is therefore presumed to be a result of tonal spreading from the stem. All spread H-tones split into L and H resulting in rising tones (see Footnote 2).

Without going into the details of tonal derivation, it deserves mentioning that the tonal values of the plural stem (L for Class I and H for Class II) are the same as the first tonal element of the singular stem. We can propose, therefore, that derivation of the plural stem from the singular stem is accompanied by deletion of the second tonal element in addition to shortening.

With stem length, Class I verbs show some variation across dialects (see Table 8). In Eastern varieties, they have a short vowel throughout the paradigm. In Western dialects, stems that end in non-sonorants have a short vowel, but stems that end in a sonorant have an overlong vowel in the singular. Class II verbs (Table 9) are always overlong with singular persons and short with plural persons, in both Eastern and Western dialects.

Table 8: Inflected paradigm of bʊ̱́l 'roast.TR' (Class I)

	Singular		Plural		Dual
	Western Nuer	Eastern Nuer			
1	bɔ̱̆ɔɔlɔ̱́	bɔ̱̆lɔ̱́	bɔ̱̀lkɔ̀		
1+2(incl)			bɔ̱̆lnɛ̂		bɔ̱̀lɛ̀
2	bŭ̱uulɪ̱́	bŭ̱lɪ̱́		bɔ̱̀lɛ̀	
3	bɔ̱̆ɔɔlɔ̱́	bɔ̱̆lɔ̱́		bɔ̱̀lkɔ̀	

For the sake of comparison, Table 10 shows a Western Nuer paradigm of a Class I transitive verb which ends in a non-sonorant. In contrast to sonorant-final verbs, the stem in Table 10 is short in singular forms. The corresponding

Table 9: Inflected paradigm of nêɛn ‘see.TR’ (Class II)

	Singular	Plural
1	nêaaanə̰̀	nɛ̆ankɔ̂
1+2(incl)		nɛ̆anɛ̂
2	nêɛɛnɪ̰̀	nɛ̆anɛ̂
3	nêɛɛnɛ̀	nɛ̆ankɛ̂

Table 10: Inflected paradigm of kɔ̆k ‘buy.TR’ (Class I) (Western Nuer)

	Singular	Plural	Dual
1	kɔ̆aɣə́	kɔ̀akɔ̀ (EXCL)	
1+2(incl)		kɔ̆aɣnɛ̂ (INCL)	kɔ̀ahɛ̀
2	kɔ̆ɣɪ́	kɔ̀ahɛ̀	
3	kɔ̆ɣɛ̂	kɔ̀akɛ̀	

Eastern Nuer paradigm of this verb is exactly the same, except for the lack of consonantal mutation in the plural.

Finally, in Western dialects of Nuer, stem-final stops are mutated in the plural (Table 11). The underlying stops /p, ʈ, t, k, c/ are realized as voiceless continuants /f, θ, ɽ, ç, h/. Moreover, the alveolar and velar stops undergo a separate process of lenition when they are intervocalic: /k/ –> /ɣ/ and /c/ –> /j/.[8] The result is an alternation between a stop and continuant or between two different continuants (The underlying stop may be found in other parts of the paradigm; e.g. the NSF of ‘buy.TR’ (the form used with an immediately post-verbal subject) is *kɔ̂k*, and the NSF of ‘cane.TR’ is *dwə́c*.) It is perhaps possible to link the morphologically conditioned consonantal mutation to changes in stem vowel length, as was suggested above in regards to tonal alternations.

[8]Note that this must be understood as a morphophonological process targeting stem consonants, because unlenited intervocalic velars occur in other contexts, e.g. in suffix-initial position. Moreover, the variants [ɣ] and [j] also occur word-finally in nominal forms which contain a lengthened vowel, further supporting the notion that we are dealing with two separate morphophonological lenition processes: one that mutates all stops into voiceless continuants, and another that mutates the palatal and velar stops only, yielding voiced continuants.

Table 11: Stem-final consonant lenition (Western Nuer varieties only)

	'wait.TR'	'sing.TR'	'buy.TR'	'cane.TR'
3SG	lîiib-è	kîiid-è	kɔ̆ɣ-ê	dwɪ̰̀j-è
2PL	lĭɛf-ê	kĭɛr̥-ê	kɔàh-è	dwɐ̰̆ç-ê

4 Verbal derivation

Verbal derivation involves stem modification alone; there are no segmental derivational affixes. In addition to the antipassive (derived intransitive), we have identified derived ditransitive, centripetal and multiplicative paradigms.

All derived verbs have Grade 2 stem vowels.[9] Table 12 illustrates the correspondence between basic transitive verbs with Grade A stem vowels and derived verbs with Grade 2 vowels.

Table 12: Vowel quality modification in derived forms (Western Nuer)

Basic, 2SG (Grade 1)		**Derived, 2SG (Grade 2)**	
t̪âaaɣ-ɪ̀	'hold'	t̪ɪ̰̀h-ɪ̀	'hold for' (ditransitive)
rîŋ-ɪ̀	'run'	rɪ̰̀ŋ-ɪ̀	'run towards me' (centripetal)
cɔ̂ɔɔl-ɪ̀	'call'	cʊ̰̀l-ɪ̀	'call for' (ditransitive)
pʊ̆d-ɪ́	'break'	pʊ̀r̥-ɪ́	'break many times' (multiplicative)
nêɛɛn-ɪ̀	'see' (transitive)	nɐ̆n-ɪ́	'see' (antipassive)

What distinguishes the different types of derived verbs, is their length and tonal properties. We will focus here on the antipassives, as these are the most productive and hence best represented in our data. We distinguish two types of antipassives. Antipassive I involves complete deletion of the direct object, while Antipassive II allows the inclusion of a demoted direct object with the preposition *kɛ*. Compare, for example, the transitive construction mâaaɖ̀ pʊ́u 'you are drinking water' with Antipassive II construction mɪ̰́ɖ̀ kɛ pʊ́u (same translation).

The two types of antipassives share some morphological properties and differ in others. Both of them lack the alternations of tone and stem length characteristic of transitive verbs. Stem length is always short, while tone is based on that of the corresponding transitive verb. If derived from a Class I transitive verb, both

[9] With the exception of the class of intransitives mentioned in Footnote 5.

have a low toned stem and a high toned (or falling, if the vowel is modal) suffix. However, the two types of antipassives differ when derived from verbs of Class II: Antipassive I has a rising tone followed by a high (or falling, if the vowel is modal) suffix, while Antipassive II has a high (or falling over a modal vowel) stem and a low suffix. Abstracting away from tonal differences that are due to the phonation of vowels, we have the tonal patterns for the two Antipassives as shown in Table 13.

Table 13: Nuer tonal patterns in basic transitive verbs and Antipassive I and II

	Transitive		**Antipassive I**	**Antipassive II**
	Sg (VVV)	Pl (V)	Sg/ Pl (V)	Sg/ Pl (V)
Class I	HH-H → LH-H	L-L	L-H	L-H
Class II	HL-L	H-H → LH-H	H-H → LH-H	H-L

In all the cases shown in Table 13, the tone on the stem of the antipassive is the same as that of the plural of the corresponding transitive. Since both transitive plural and antipassive formation involves shortening, it is tempting to suggest – as we did for the transitive plural – that this is the cause of the tonal contour of the antipassive, i.e. the second tonal element in the singular transitive stem is deleted, leaving behind L for Class I verbs and H for Class II verbs.

However, this does not explain the difference in the tone of the suffix: in Antipassive I it is always high, while in Antipassive II it is polar to the tone of the stem. We propose that this is due to a floating tone that is part of the derivational morphology that produces antipassives: H in Antipassive I, but P(olar) in Antipassive II.[10]

Verbs which may be considered "basic" intransitives (i.e. they do not have a corresponding transitive) share some aspects of Antipassive II morphology. They have a short vowel in all inflected forms, and follow one of two tonal patterns that exist for Antipassives II. Table 14 provides examples for the two tonal classes for each antipassive and for the underived intransitive verbs:

[10] The two antipassives also differ in their NF1 forms. The NF1 form of Antipassive I is a Grade 2 vowel, as expected for an antipassive verb, while for Antipassive II it is Grade 1, i.e. the grade found in the underived transitive: compare transitive *nêɛn* 'see', with its Antipassive I NF1 form *nèn* (Grade 2), and transitive verb *mâaɑ̱* 'drink', with its Antipassive II NF1 form *maaaɑ̱* (Grade 1).

Table 14: Examples of tonal classes of Antipassives and Intransitives (Eastern Nuer)

	Antipassive I		Gloss	Antipassive II		Gloss	Intransitive		Gloss
	3SG	2PL		3SG	2PL		3SG	2PL	
Class I	bu̱lê	bo̱lê	'roast'	tẹ̱dê	tèdê	'dig'	cjẹ̱ŋê	cjèŋê	'live'
Class II	nẹ̱nê	nẹ̈nê	'see'	mą̱dè	mą̱dè	'drink'	wu̱rè	wo̱rè	'run'

All other derivational classes of verbs have tonal contours that are not based on tonal characteristics of the lexical stem, but rather are predetermined by its derivational class. Table 15 provides a summary and examples.

Table 15: The summary of derivational classes with grammatical tone (Eastern Nuer)

Derivational class	Vowel grade	Tone		Length
		SG	PL	
Ditransitive	2	H-L	H-L	V
Centripetal	2	L-H	H-L	V/VVV
Multiplicative	1 or 2	L-H	H-L	V/VVV
Stative	1 or 2	H-H	H-H	V
Middle	1 or 2	H-H	H-H	V/VVV

Derivational class	Example		Gloss	Basic verb 3SG
	3SG	2PL		
Ditransitive	cọ̱l-è	côl-è	'call'	cɔ̂ɔ̀l-è
Centripetal	rị̱ŋ-é	rị̱eŋ-è	'run'	rîŋ-è
Multiplicative	pụ̱d-ê	pọ̱d-è	'break'	pụ̈d-ê
Stative	dị̈d-ê	dị̈et-ê	'be big'	n/a
Middle	ŋ̱aaan-ê	ŋ̱aaan-ê	'tire'	ŋ̱ɔ̱ɔn-è

Stative and middle verbs also have a similar morphology in some respects. However, while stative verbs follow the alternation between Grade A and Grade B that was established for other intransitive verbs (see Table 5), middle verbs (involuntary and reflexive actions, see Footnote 5) have Grade B in all forms.

Whether consonantal lenition is present in all derivational classes has not yet been fully determined, since our data from Western Nuer dialects is limited in this

regard. However, so far it appears that stem-final consonantal lenition applies in all forms of derived verbs. Table 16 provides necessary examples in support of this assertion.

Table 16: Stem-final consonant lenition (Western Nuer)

Transitive			Derived		Derivational Class
3SG	2PL	Gloss	3SG	2PL	
kɔ̆ɣ-ɛ̂	kɔ̀ah-ɛ̀	'buy'	kɔ̰̀h-ɛ̀	kôh-ɛ̀	Benefactive (ditransitive)
			kôh-ɛ̀	kôah-ɛ̀	Unknown (meaning 'sell')
kîiid-ɛ̀	kĭɛɾ̰-ɛ̂	'sing'	kɪ́ɾ̰-ɛ̀	kɪ́ɛɾ̰-ɛ̀	Benefactive
			kɪ̆ɾ̰-ɛ̂	kɪ̆ɛɾ̰-ɛ̂	Antipassive
pʊ̰̆d-ɛ̂	pɔ̰̀ɾ̰-ɛ̀	'break'	pʊ̰̀ɾ̰ɛ̂	pɔ́ɾ̰-ɛ̀	Multiplicative

Additionally, in all Nuer dialects, both Western and Eastern, there is a consonantal alteration */t/~/l/* which participates in verbal derivation, but not in verbal inflection. For example, the 3SG form of the transitive verb "pound (dura)" is *ɣɔ̰́ɔ̀l-ɛ́* but the 3SG of the intransitive verb derived from the same root (i.e. the antipassive) is *ɣɔ̰́t-ɛ́*. Interestingly, the NF1 form in the Antipassive II paradigm, which has a stem vowel of Grade 1 (see Footnote 10), also has /l/ in stem-final position, not /t/. Therefore, NF1 of Antipassive II patterns with the transitive verb from which it is derived not only in the quality of its vowel but in the quality of its consonant as well.

5 Nominal system

5.1 Overview

Noun inflection employs the same morphological devices surveyed above for verbal morphology. But in contrast to the verbal system with its fixed paradigmatic templates, noun inflection involves a great number of different patterns that divide the lexicon into an as of yet undetermined number of inflection classes. Given both the large number of distinct types, we cannot do justice to the topic here, and limit ourselves to a general overview.

The noun paradigm is made up of five cells: two numbers and three cases (nominative, genitive and locative) with the genitive and locative always syncretic in

the plural. Alongside stem modification, nominal inflection may involve suffixation, which is also subject to lexical specification (in contrast, again, to the verbal system).

5.2 Vowel quality modification

The nominative singular form (Nom Sg) may have the vowel of any grade (1A, 1B, 2A, 2B). However, whether this form has a vowel of Grade A or B has repercussions for the rest of the paradigm.

Because suffixation potentially has an effect on stem vowel behavior, we first describe the patterns as found with unsuffixed nouns. For all such nouns, the genitive singular form has the vowel of Grade B. In that minority of paradigms where a distinct locative singular form is found, it has the vowel of Grade A. The plural either has the vowel of Grade B or a vowel that is raised to Grade 2.[11] A distinct minor pattern is represented by so-called "basic plurals"[12], like *ɟûɔɔɔl* 'hip joint' and *cé̤t̤* 'excrement', whose vowel alternation between nominative singular and plural is the mirror-image of what we find elsewhere. In this case, the singular oblique forms share properties with both the nominative plural and the nominative singular, i.e. the vowel in Gen Sg *cɛ̤at̤* is the lowered counterpart of the vowel in Nom Pl *cĕt̤* but breathy, like Nom Sg *cé̤t̤*. Table 17 provides a summary of attested vowel quality alternations. Every pattern illustrated in the table also has a variant where there is no distinct locative singular form (i.e. the form labeled *genitive* here serves for both).

Table 17: Vowel quality variation in nominal paradigms (Eastern Nuer)

Nom Sg	Gen Sg	Loc Sg	Nom Pl	Examples				
				Gloss	Nom Sg	Gen Sg	Loc Sg	Nom Pl
A	B	A	B	'big river'	kîir	kîɛɛɛr	kîiir	kîɛr
A	B	A	raised (2A)	'back'	ɟɔ̀k	ɟɔ̂ak	ɟɔ̂k	ɟò̤ok
B	B	A	B	'home'	cjêeŋ	cjêŋ	cjé̤ŋ	cjêeeŋ
B	B	(A)	raised (2A)	'pitcher'	lîɛɛɛr		lîɛr	lɪ̤eeer-ì
Basic plurals								
B	B	A	A	'hip joint'	ɟûɔɔɔl		ɟûɔl	ɟûl
raised (2A)	B	(A)	A	'excrement'	cé̤t̤		cɛ̤at̤	cĕt̤

[11] Where the singular is itself of Grade 2, this raising is vacuous, eg. Nom Sg *t̤ʌ́ʌk* ~ Nom Pl *t̤ʌ̆ʌʌk* 'ox'.

[12] These are typically nouns which will at least once have had a collective sense, and can thus be interpreted as having descended from 'basic plurals' that were suffixed in the singular only (Storch 2005; Dimmendaal 2000).

The system of suffixation can then be described on the basis of this underlying pattern of vowel alternations. The oblique singular suffix is *-(k)Ạ́*.[13] The conditions under which the suffix is used are complex, and vary across dialects[14], so we note here just some basic principles. First and foremost, the suffix is used in the majority of cases where the Nom Sg has a vowel of Grade B, and only rarely where it is of Grade A, so its use is roughly correlated with the stem vowel. The suffix always takes a Grade A vowel in the stem, and length and tone of the stem are always the same as in the nominative singular form. The tone of the suffix is polar to the tone of the stem.

Table 18: Nominal paradigms with suffixed obliques (S = suffixed singular oblique form)

Nom Sg	Obl Sg	Nom Pl	Examples			
			Gloss	Nom Sg	Gen Sg	Nom Pl
A	S	A	'stick'	kɛ̀ɛɛt	kɛ̀ɛɛd-Ạ́	kɛ̀ɛɛd-ní
B	S	A	'sheep'	rɔ̀aaam	rɔ̀ɔɔm-Ạ́	rɔ̂ɔɔm

The behavior of stem vowels with suffixes in the nominative plural (see Table 19) is rather more complex. In brief, there are two patterns: (i) the suffix is appended to a plural stem following any of the patterns outlined in Table 17, or (ii) the suffixed form retains the vowel found in the Nom Sg, as in *kɛ̀ɛɛd-ní* 'stick'.

5.3 Vowel quantity modification

The most common pattern in our data is, taking the nominative singular as a reference point, to have lengthening in the singular oblique cases and/or in the plural, so there is a rough correlation between vowel quality and quantity modi-

[13] The initial [k] of the singular suffix appears only following a vowel, which in our noun data only occurs through the regular deletion of stem-final [h] before [k], thus 'monkey': Western Nuer *gɔ̂ɔh* Nom Sg, *gɔ̂ɔ-kẠ̀* Gen/Loc Sg (vowel-final stems do occur in pronouns, e.g. *ŋu-kẠ* 'what? gen/loc sg'). The initial [n] of the plural suffix is often assimilated to a preceding liquid consonant. The tone of both suffixes is predictable based on the stem: H if the stem has L or LH tone, and L if the stem carries an H or HL.

[14] It appears that singular oblique forms that are not lengthened in respect to the nominal singular in Western Nuer are being replaced by suffixed forms in Eastern Nuer, sometimes with both alternatives co-existing. Acceptability of such suffixed forms varies greatly by speaker and by lexical item. For example, W. Nuer *tùɔɔɔŋ* "egg" has a Gen Sg *tûɔŋ* which is rejected by some speakers of E. Nuer in favor of *tɔ̀ɔɔŋ-Ạ́*.

Table 19: Suffixed nominative plural forms (Eastern Nuer)

Nom Sg	Nom Pl	Examples			
		Gloss	Nom Sg	Gen Sg	Nom Pl
1B	2A	'pitcher'	lîɛɛɛr	lîɛr	ĺ̪eeer-ì
2A	2A	'spear'	mṵ̱t	mṵ̱ɔt	mṵ̆d-ní
1A	1B	'chair'	kɔ̂ɔm	kɔ̀aaam	kɔ̀am-ní
1A	1A	'stick'	kɛ̀ɛɛt	kɛ̀ɛɛd-ɹ̱́	kɛ̀ɛɛd-ní

fication: the alternation from Grade A to B typically involves lengthening. But in principle any combination of the two may occur, as illustrated in Table 20. The only cell in the paradigm that shows a three-way length contrast is the nominative singular; stem vowels in the genitive singular and the nominative plural forms are always either short or overlong. The only paradigms where all three vowel lengths are found, are those of nouns that belong to the "basic plural" class (see Footnote 9) where the nominative singular form has a long vowel. The genitive singular in these paradigms is lengthened and their nominative plural is shortened (see 'bead' in Table 20). One pattern ('fisherman' in Table 20) is bound with a particular suffixation pattern: if both nominative singular and plural have overlong vowels, the genitive (and locative) singular is suffixed.

Where the locative singular form is distinct from the genitive singular form, it may have an overlong or a short vowel in no apparent relation to the rest of the paradigm.

5.4 Tonal alternations

Tonal alternations between the various singular nominal forms have not been sufficiently understood yet. It appears that every possible tonal pattern is attested.[15] In (unsuffixed) plural forms, on the other hand, the tone is more predictable. The vast majority of plural forms have either high (H) or falling (HL) tone based on the phonation of the vowel: *dîiit* 'birds', *rɔ̂ɔɔm* 'sheep', *t̪̱ɔ̰̱ɔl* 'snakes', *p̪̱aaar* 'clouds'. This generalization is in line with claim made in Gjersøe (2017) that plurals are always high-toned. However, it is important to note that there are two

[15]For Eastern Jikany, Gjersøe (2017) reports L tone as an exponent of oblique singular cases and H tone as an exponent of nominative plural. Our observations contradict her claims on several points. We find that oblique singular and nominative plural forms show the same range of tonal contrasts that is found in the nominative singular forms.

Table 20: Vowel length in nominal paradigms (Eastern Nuer)

Nom Sg	Gen Sg	Nom Pl	Examples			
			Gloss	Nom Sg	Gen Sg	Nom Pl
V	V	V	'buffalo'	mo̱k	mòk	môk
V	VVV	VVV	'Nile perch'	cä̱l	cä̱aal	cä̱ʌʌl
VV	VVV	VVV	'bird'	dîit	dìɛɛɛt	dîiit
V	VVV	V	'forest'	rŭ̱p	rú̱ɔɔɔp	rú̱ɔp
V	V	VVV	'rat'	kù̱n	kú̱ɔn	kú̱ɔɔɔn
VVV	S	VVV	'fisherman'	de̱̱eep	de̱̱eep-ä̱	dêeep
Basic plurals						
VVV	V	V	'elephant'	gwo̱̱ɔɔr	gwo̱̱ar	gwo̱̱r
VV	VVV	V	'bead'	tîik	tîɛɛɛk	tîɛk

V=short stem vowel, VV = long stem vowel, VVV = overlong stem vowel, S = suffixed singular oblique form

nominal classes that do not follow this rule. In plurals containing a vowel that is raised (sometimes vacuously) in respect to the singular (i.e. Grade 2), the tone of the plural may be H or it may be LH: *ɟjŏ̱ook* 'dogs', *t̪ä̱ʌʌk* 'oxen', *lĕ̱eek* 'k.o. fish (plural)'. Additionally, as with other morpho-phonological properties, "basic plurals" show a reversal of the expected pattern: the plural form may carry any of the tonal contours found in regular singulars, while the singular form either has a high or falling tone based on the phonation of the vowel. For example, the plural of the "basic plural" noun 'fish' is *rɛ̆c*, while the singular form is *rɛ̱̆c*.[16]

Moreover, suffixed plural forms seem to follow a predictable tonal pattern. First of all, in this regard it is important to make a distinction between two varieties of the plural suffix *-ni*, as the effects of the plural suffix depend on its paradigmatic distribution. One variety of *-ni* is used just as an oblique marker (genitive and locative): it is simply added to the nominative plural form and has no further effect on the stem. The other variety is used as a general plural marker, i.e. for all cases in the plural. The stem vowel used with this suffix may be changed in relation to the nominative singular, or it may remain the same. The tone of such plurals is H-H (realized as LH-H), e.g. *mŭ̱t-ní* 'spears' and *wä̱̆ar-í* 'shoes', or L-H, e.g. *t̪àaak-ní* 'clocks' and *kɔ̀am-ní* 'chairs'.

[16]The forms shown are in the Eastern dialect of Nuer.

5.5 Stem-final consonant lenition

Consonantal lenition in the nominal paradigms of Western Nuer varieties seems vaguely to follow the pattern of vowel quality modification, where the stop corresponds to Grade A and a mutated consonant (i.e. a continuant) corresponds to Grade B in vowels. The correspondence is all the more striking that even though lenited consonants do not normally appear in nominal singular forms, whenever they do, a suffixed oblique singular form is used. This is an intriguing parallel to the use of suffixed singular oblique forms in paradigms where the nominative singular form has a Grade B vowel. The parallel is not perfect, however: as evident from Table 21, vowel Grade B does not actually necessarily co-occur with consonantal lenition – it only tends to favor the same patterns of distribution.[17]

Table 21: Consonantal lenition in nominal inflection (Western Nuer)

			Examples			
Nom Sg	**Obl Sg**	**Nom Pl**	**Gloss**	**Nom Sg**	**Obl Sg**	**Nom Pl**
P	F	F	'gift'	mu̱c	mu̱ɔç	mu̱ç
P	P	F	'tongue'	lêp	lèap	le̱eef
F	S	P	'hyena'	jâh	jâkṉ	ja̱aah
P	F	P	'fingernail'	rjɔ̀p	rjôf	rjóp

P= plosive; F = voiceless continuant; S = suffixed form

As with verbs, this type of consonantal lenition combines with another process of lenition associated with dorsal consonants, which in this case occurs whenever the stem vowel has been lengthened;[18] thus 'neck': *ŋwá̱k* NOM SG ~ *ŋwá̱h* NOM PL (with consonant lenition) ~ *ŋwà̱aaɣ* GEN SG (with lengthening-induced lenition).

The stem-final alternation *l~t* also shows up in the nominal paradigm in both Eastern and Western varieties of Nuer. The alternation is confined to those plurals which involve shift from the vowel of Grade 1 to Grade 2 in the plural: compare *dêɛl* 'goat/sheep.NOM SG' (*dêaaal* OBL SG) and its NOM PL *dë̱t*.

[17] In this regard it may be interesting to note that within the verbal paradigm, consonantal mutation occurs in NF1 forms of underived verbs but not in NSF or NF2 forms. Vowel Grade B likewise never appears in NSF and NF2 (with the exception of "middle" verbs – see Footnote 5), but does occur in NF1 forms of some verbs.

[18] Though lengthened with respect to what is itself a tricky question; in purely descriptive terms, we would expect to find a shorter stem somewhere else in the paradigm of such a noun.

6 Conclusions

Stem modification in Nuer is noteworthy both for what it does and does not share across the two major word classes of verbs and nouns. The actual morphophonological operations are the same, perhaps most strikingly in the presence of two phonologically and functionally distinct series of vowel quality alternations. But the way that stem modification behaves could not be more different between the two word classes. Verb inflection follows a strict paradigmatic template, so that given e.g. the 3SG form, the rest of the paradigm is predictable. Nothing of the sort in noun inflection. Of course, all is not chaos – as we have shown, each stem modification process is constrained both in terms of the alternants, and in terms of its paradigmatic distribution. But the fact that (i) whether or not a stem modification process occurs is usually lexically specified, and (ii) the different stem modification processes are largely independent of one another, means that the degree of unpredictability in the paradigm is high.

Having laid out all the facts in regards to vowel quality alternation, we can now address basis for the assumption that Grade B is derived from Grade A, and Grade 2 is derived from Grade 1, and not vice versa. Our primary motivation is that the relationship between the two main grades (1 and 2) and their subgrades (A and B) is easier to capture formally assuming that Grade 1A is the starting point for the derivation of other grades. Adopting the view that Grade 1A is "basic", both Grade 1B and Grade 2A are just one phonological operation away: diphthongization/lowering to derive the vowel of Grade 1B and raising/addition of breathiness to derive the vowel of Grade 2A. Grade 2B is then derived from Grade 2A by applying removal of breathiness and diphthongization/lowering in a way that parallels derivation of Grade 1B from Grade 1A. If we were to assume Grade 1B as basic, the derivation of Grade 2A would involve two steps: monophthongization and then further raising/addition of breathiness.

Another consideration in regards to treating the Grade 1A as "basic" has to do with markedness, both phonological and morphological. Grade 1A is comprised of [-ATR] monophthongs, most of which are not breathy. They are also found in "simpler" morphological environments. Vowels of Grade 1 are used in underived transitive verbs, while vowel of Grade A are found in unsuffixed forms that are used with inflected auxiliaries or with a postverbal subject (NF1, NF2, NSF). Within the nominal system, vowels of Grade 1A are found in the nominative, never in the genitive (unless segmentally suffixed, in which case one could say the job of case marking has been entirely ceded to the suffix). In contrast, vowels of other grades, can be argued to be more complex phonologically, either by be-

ing diphthongs, or by involving features such as [+SG] (i.e. +Spread Glottis, i.e. breathiness) and [+ATR]. These grades are found in forms which are presumed to be also more complex morphologically: derived verbs and oblique case-forms. It is logical to propose that the complication to the phonological make-up of vowel grades other than Grade 1A is due to presence of derivational and inflectional morphemes that have featural rather than segmental exponents.

The vowel quality modification provides an intriguing point of comparison in relation to Dinka, a close relative of Nuer. Andersen (1993) shows that in Dinka vowel quality in the inflected paradigm is modified in a way similar to Nuer, by means of inserting a lower vocalic element after the basic vowel. However, fewer diphthongs are attested in Dinka than in Nuer. Specifically, stems containing non-high vowels /ɔ/ and /ɛ/ as basic vowels have monophthong /a/ in forms with modified vowel quality. As Andersen theorizes, diphthongs /ɔa/ and /ɛa/ are part of the intermediate representation at some point in derivation of these forms, but the first element in these diphthongs is deleted in Dinka. This parallel between Nuer and Dinka provides another motivation for treating Grade B as derived from Grade A. It is clear that such is the direction of derivation for the equivalent grades in Dinka, since, if the derivation of vowel grades proceeded in the other direction, the outcome of Grade A could not be predicted based on the quality of the vowel in Grade B in Dinka due to the fact that several values of Grade A correspond to a single value of Grade B.

Nevertheless, having justified the notion of Grade 1A as "basic", it is important to keep in mind that for any specific target that is subject to modification, the "basic" variant may not necessarily be found anywhere in the paradigm. The Western Nuer paradigm of the noun *lîɛɛɛr* "water jug/pitcher" can attest to that: the vowel /i/ of Grade 1A does not show up in any of its forms, i.e. Nom Sg *lîɛɛɛr*, Gen Sg *lîɛr,* Nom Pl *l̤ieeer-í.* Still, the "basic" vowel is recoverable due to one-to-one correspondences between vowels of different grades, and does indeed show up in the suffixed oblique singular form used in Eastern Nuer varieties (see Footnote 14), i.e. Obl Sg *lîiir-à̤*.

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Abbreviations

AP	antipassive	NF2	non-finite form 2
CP	centripetal	NSF	non-suffixed form
EXCL	exclusive	NOM	nominative
GEN	genitive	OBL	oblique
IN	intransitive	PL	plural
INCL	inclusive	SG	singular
LOC	locative	TR	transitive
NF1	non-finite form 1		

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