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KURMUK PHONOLOGY*

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This article describes the basic aspects of the phonology of Kurmuk, a previously undescribed language belonging to the Northern Burun subbranch of the Western Nilotic family. After a morphosyntactic overview, the treatment of the phonology includes syllable structure and word shapes, vowels and vowel alternation, consonants and consonant alternation, and tones and tonal processes.

1. Introduction.

Kurmuk is a small Western Nilotic language spoken in the southern part of Blue Nile Province in Sudan. It belongs to the group of closely related languages which Evans-Pritchard (1932: 34) called Northern Burun. Their closest relatives are the Southern Burun languages Mabaan, Jumjum and Ulu (Andersen 2006: 6), together with which they constitute the Burun branch of Western Nilotic. The other branches of this family are the Lwo languages, which include among others Dholuo, Anywa, Päri and Shilluk, and the Nuer-Dinka languages. Western Nilotic is a branch of the Nilotic family, whose other branches are Eastern Nilotic and Southern Nilotic. There are no previously published studies of Kurmuk, except for two short word lists in Evans-Pritchard (1932: 37-41). According to Ecsedy (1973: 143), the Northern Burun people comprise eight tribes, but it is not clear to what extent each of these tribes speaks a separate variety of Northern Burun.

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Some aspects of another Northern Burun language, Mayak, have been described in Andersen (1999a, 1999c, 2000) and in Storch (2005).

The present article describes the basic aspects of the phonology of Kurmuk. Section 2 provides some necessary background information on the syntax and morphology of this language. Section 3 deals with syllable structure and word shapes. Section 4 describes the vowel system, including vowel harmony and other types of vowel alternation. Section 5 describes the consonant system and some of the phonological processes that affect the manifestation of underlying consonants. Section 6 deals with the major aspects of the tonal system, including the differences between underlying tones and their surface representation. Section 7 contains some closing remarks. Although the focus of the article is a synchronic description of a single language, some comparative and historical remarks on other Nilotic and other languages are occasionally included, mostly in footnotes.

2. Morphosyntactic Background.

2.1. Clause structure and subject suffixes. The basic order of clause constituents in Kurmuk is subject-verb-object, as in the intransitive clause (1a) and the transitive clause (1b).¹

(1)) a. kámbál [↓] m girl da		↓mέεl→ dance→	-í -ASS	'The girl is dancing.'
	b.	kámbál girl	∫àap boil	kòokóok meat	'The girl is cooking meat

With transitive verb stems there is an alternative construction, as seen in (2a). Here the logical object precedes the verb, while the logical subject follows

¹ The following abbreviations are used in (interlinear) morphemic translations: 1 first person; 1PL first person plural; 1PLEX first person plural exclusive; 1PLIN first person plural inclusive; 1SG first person singular; 2PL second person plural; 2SG second person singular; 3 third person; 3PL third person plural; 3SG third person singular; AP antipassive; ASS assertive; BEN benefactive; CF centrifugal; CONT continuous; CP centripetal; D1 first person demonstrative; D2 second person demonstrative; D3 third person demonstrative; FOC focus; FUT1 near future; FUT2 distant future; HAB habitual; ID1 first person demonstrative identifier; ID3 third person demonstrative identifier; LOC locative; M multiplicative; PASS passive; PL plural; PRED predicative; PRO proform; PROH prohibitive; PST past; PTCPL participle; SG singular or singulative.

the verb after the preposition ya, thus being demoted to adverbial status. In this construction, which I call "passive," the verb takes a (passive) suffix -(C)I.² The logical subject can be left out, as in (2b).

 (2) a. kòokóok ∫áap -ì ŋà kámbál meat boil -PASS by girl
 'The meat is being cooked by the girl.'

b. kòokóok ∫áap -ì -r
 meat boil -PASS -ASS
 'The meat is being cooked.'

When the logical subject of a transitive verb stem is pronominal, there are three alternative constructions: (i) The subject may occur in preverbal position in a short (clitic) form, as in (3a); (ii) it may be expressed by a suffix in the verb, while the object occurs before the verb, as in (3b); or (iii) the logical subject may be demoted to an adverbial in a passive construction, where it has its full citation form, as in (3c).

- (3) a. à ∫àap kòokóok
 1SG boil meat
 'I am cooking meat.'
 - b. kòokóok ∫áab -à -r meat boil -1SG-ASS 'I am cooking the meat.'
 - c. kòokóok ∫áap -ì ŋà ?áaní∫ meat boil -PASS by 1SG
 'The meat is being cooked by me.'

The short preverbal personal pronouns may also be (logical) objects, as in (4).

² Here and elsewhere, "(C)" in a cited suffix symbolizes a consonant which is only present as a separate segment after certain morpheme-final consonants, which determine its articulation. When not present as a separate segment, the suffix consonant may still have some effect on the preceding consonant, cf section 5.6 below.

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(4)	à	n∧g-úd - [↓] íkí -r	'They beat me.
	1SG	beat -PST -3PL -ASS	

A third person singular pronominal preverbal subject or object is zero, as in (5a) and (5b), respectively.

(5)	a.	∫àap boil	kòokóok meat	'He/She is cooking meat.
	b.	∫àab - boil -	-à -r -1SG-ASS	'I am cooking it.'

The inventory of subject suffixes is shown by the paradigm in (6), which also includes the passive form for comparison. Here the subject suffixes are preceded by a past tense suffix and followed by a suffix -r, which I gloss "assertive" (ASS), cf section 2.4 below. For first person plural there is a distinction between inclusive and exclusive. The first person plural inclusive suffix is preceded by what may be analysed as the passive suffix, while there is no passive suffix in the other forms.

(6)	1SG	?ám -údg -λg −r eatg -PST -1SG -ASS	'I ate it.'
	2SG 3SG 1PLIN	?ám-úd॒- [↓] í-r ?ám-úd॒- [↓] í-r ?ám -útූ -ì -wéɛ -r eat -PST -PASS -1PLIN -ASS	'You ate it.' 'He/She/It ate it.' 'We ate it.'
	1PLEX 2PL 3PL PASS	?ám-úd॒-ònò-r ?ám-úd॒- [‡] éɛ-r ?ám-úd॒- ^t íkí-r ?ám-út-ì-r	'We ate it.' 'You ate it.' 'They ate it.' 'It was eaten.'

A subject may precede a preverbal object, in which case it is cross-referenced by a suffix in the verb, as in (7).

 (7) mí -k dúbán ¹?úur -úd -¹íkí -r woman-PL polenta stir -PST -3PL -ASS 'The women have cooked the polenta.' In imperative clauses the verb always takes a subject suffix, as in (8)-(9), and an object may follow the verb, as in (9).

(8)	bùd_í run -2SG		'Run!'
	bùdੁ-έε run -2PL		'Run!'
(9)	gèb -í cut -2SG	yáa <u>t</u> tree	'Cut the tree!'
	gèb -ée cut -2PL	yáat tree	'Cut the tree!'

While adverbials generally occur in clause-final position, as in (10), certain particles occur in preverbal position after the subject or object slot. Such particles include the negation \acute{ana} 'not', as in (11), and the alternative future tense particles \acute{a} of near future and \acute{ay} of distant future, as in (12).

(10)	?́nd -á	win-ìț	kà	ŋìır	?ìn	yừ
	cut:M -HAB	rope-SG	with	knife	PRO:SG	be.sharp
	'He/She cut	s the rope	with	a sharp	knife.'	

- (11) tùl -ìn áná máad -á mòo child -PL not drink -HAB beer(PL)
 'Children do not drink beer.'
- (12) mí -n [↓]báar á ∫áap kòokóok woman-SG of:1SG FUT1 boil meat 'My wife is going to cook the meat.'

dɛ̀ɛl áy tùw-ì goat FUT2 die -ASS 'The goat will die.' Negation and a future tense particle may co-occur in that order, in which case they coalesce into one phonological word, as in (13a). They may also coalesce with a preceding short (clitic) subject or object pronoun, as in (13b).

(13)	a.	áná -a	?ím	-⁺bí	'He/She is not going to eat.'
		not -FUT1	eat	-AP	
	b.	à -aná-ay 1SG-not -FU	T2	?àm -bí eat -AP	'I will not eat.'

2.2. Inflection for tense and aspect. Verbs are inflected for tense and aspect. There is a contrast between a non-past tense, which is morphologically unmarked, as in (14a), and a past tense, which is marked by a suffix $-(u)u(\underline{t})$, as in (14b). There are also two imperfective aspect suffixes, which express continuous and habitual meaning, respectively, as in (14c-d). Both of the aspect suffixes have the segmental form $-(a)a(\underline{t})$, but generally they are tonally distinct. They may co-occur with the past tense suffix, in that order, as in (15).

- (14) a. táarák kàl dínt person steal goat:PL
 'The man is stealing goats (successfully).'
 - b. táarák ⁴kál-ú ⁴dínt person steal-PST goat:PL
 'The man stole goats.'
 - c. táarák kàl -á díit person steal-CONT goat:PL
 'The man is trying to steal goats.'
 - d. táarák ⁴kál-á ⁴dínt
 person steal-HAB goat:PL
 'The man steals goats.'

(15) mí -n láal -ád -¹úu ?á¹mít woman-SG make-CONT -PST food
 'The woman was preparing food.'

mí -n ∫áab -ád -úu kòokóok woman-SG boil -HAB -PST meat 'The woman used to cook meat.'

2.3. Verbal derivation. Verb stems consist of a root and zero or more derivational morphemes. The latter are expressed by suffixes, but they may also involve one or more phonological changes in the root, namely in vowel quality, vowel length, tone and final consonant. Moreover, aspect or tense suffixes sometimes coalesce with a derivational suffix. Thus, the morphology of Kurmuk is not as agglutinative as it may look.

Transitive verbal roots may be detransitivized by means of an antipassive derivational morpheme, which is expressed partly by a suffix $-(C)I \sim -(C)i$, and partly by changes in the root, as seen in (16). The antipassive derivation removes the logical object from the valency of the root. Thus, while the underived verb stem in (16a) requires a grammatical object, the antipassive verb stem in (16b) excludes a grammatical object.

(16)	a.	kámbál girl	∫àap boil	kòokóok meat	'The girl is cooking meat.'
	b.	kámbál girl	[↓] ∫́л́лр boil -	-í -r -AP -ASS	'The girl is cooking.'

Other derivational suffixes of verb stems with a transitive root include the centrifugal -(C)*I*, which expresses direction away from the deictic center, as in (17b), the centripetal $-vv \sim -uu$, which expresses direction towards the deictic center, as in (17c), the benefactive -(C)*I* $f \sim -(C)if$, which increases the valency of the verb by introducing a beneficiary as a grammatical object, as in (18b), and the multiplicative *-I*, which indicates a repeated action, as in (19b). In each set of clauses in (17)-(19), the (a)-clause shows the corresponding underived verb stem. Similar derivational suffixes are used after intransitive roots.

- (17) a. kámbál [↓]wέε∫ tá[↓]búr girl sweep dust
 'The girl is sweeping dust.'
 - kámbál wčε∫ -í tá¹búr wóo girl sweep-CF dust out 'The girl is sweeping dust out.'
 - c. kámbál wìrz -ύυ tá[↓]búr girl sweep-CP dust
 'The girl is sweeping dust hither.'
- (18) a. tòul púur wáŋ child hoe field
 'The child is hoeing the field.'
 - b. từul púr -í∫ [↓]táarák wàŋ child hoe -BEN person field
 'The child is hoeing the field for the man.'

(19)	a.	tùul child	gèp : cut	yáa <u>t</u> tree	'The child is cutting the tree down.'
	b.	tùul child	gíıb-í cut -M	yáat tree	'The child is cutting the tree.'

2.4. The assertive suffix. The verbal suffix which I gloss "assertive" (ASS) occurs only in word-final position. Its function is somewhat uncertain, but its distribution provides a clue as to what its meaning might be. The suffix is obligatory if the verb has the final position in a positive declarative clause, as in the (a)-clauses in (20)-(24). By contrast, the suffix is excluded in negative clauses, as in the (b)-clauses of (20)-(22), in constituent questions (except for 'why'-questions), as in (23b) and (24b), in imperative clauses, as in (8) above, and before objects. The suffix is also mostly absent before an adverbial, as in (25), but it is present in 'why'-questions, as in (26). Given this distribution of the suffix, I tentatively consider it to have some kind of assertive meaning.

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(20)	<u>t</u> áarák person	[↓] níın -dí sleep -ASS	'The man is sleeping.'
	táarák person	[↓] áná ním not sleep	'The man is not sleeping.'
(21)	a. từul child	?óm -b -úd -ì eat -AP -PST -ASS	'The child ate.'
	b. từul child	áná ?óm-b-ú not eat-AP-PST	'The child did not eat.'
(22)	a. từul child	búdú -r run -CP -ASS	'The child is running hither.'
	b. từul child	áná bú <u>d</u> -ú not run -CP	'The child is not running hither.'
(23)	a. kòoká meat	óok ∫áab -úd -⁄n -r boil -PST -1SG -ASS	'I cooked the meat.'
	b. ŋòo what	∫áab -úd⊴ -á boil -PST -1SG	'What did I cook?'
(24)	a.à 1SG	?òd -ú -ud -í go -CP -PST -ASS	'I came.'
	b. ŋáa who	?óḏ - [↓] ú -u go -CP -PST	'Who came?'
(25)	nàk -ì beat -PAS	kλ bὲεl -áaỵ S with cane -SG	'He is being beaten with a cane.'
(26)	từul child	wêɛg -ì tèe cry -ASS why	'Why is the child crying?'

The assertive suffix is not restricted to declarative sentences, but is also used in polar interrogative sentences, which would seem to be incompatible with the notion of assertion. However, polar interrogative sentences are identical to declarative sentences apart from a different intonation (and an optional sentencefinal particle not illustrated here). Thus, they are characterized by a general rise of the pitch somewhere in the utterance, as indicated by the upstep symbol [[†]] in (27) and (28a).

?ìnì (27) táarák néed-[†]í -r 'Do you know this person?' know-2SG-ASS D1:SG person (28) a. ?ùlàn [†]nóog -ú -r beat person:PL -M:AP -ASS 'Are the people fighting?' gà -aná nóog -ú, qÀ b. *ì*?í. méel -í beat -M:AP 3PL -not 3PL dance -ASS no 'No, they are not fighting, they are dancing.'

The assertive suffix, as defined here, has three allomorphs: $-(C)_{I}$, $-_{I}$ and $-_{r}$. They are in complementary distribution in that $-(C)_{I}$ occurs immediately after a root, as in (20) and (26), while $-_{I}$ and $-_{r}$ occur after a suffix, $-_{I}$ after a consonant, as in (21a) and (24a), and $-_{r}$ after a vowel, as in (22a) and (23a).

In summary, to the extent that verb forms are segmentable into morphs, the linear order of their morphemes is as indicated in (29).

(29) Root + Derivation(s) + Aspect + Tense + Subject + Assertion

2.5. Noun structure. Noun forms in Kurmuk are grammatically either singular or plural, and in terms of number inflection, nouns fall into three classes, as in most other Western Nilotic languages (Storch 2005) as well as more widely in the Nilo-Saharan phylum (Dimmendaal 2000): (i) Nouns with plural marking, where the singular is morphologically unmarked and the plural morphologically marked, either by a suffix, as in (30a), or by apophony, as in (30b); (ii) nouns with singulative marking, where the singular is morphologically marked by a suffix and the plural morphologically unmarked, as in (30c), or where there is no singular counterpart of the unmarked plural, as in (30d); (iii) nouns with replacive marking, where both the singular and the plural are morphologically marked by a suffix, as in (30e-f). The method of morphemic translation for each form in (30) re-

flects the type of marking and is based on implicit principles used in morphemic translations throughout this article.

(30)	0	Singular	Plural	furiout has
	a.	kui wart.hog	wart.hog -PL	wart-nog
	b.	gálám kid	gólúm kid:PL	'kid'
	c.	gìm -ìt cheeks-SG	gím cheeks	'cheek'
	d.	_	làakìn urine(PL)	'urine'
	e.	gúr -í <u>t</u> stone-SG	gúr -Án stone-PL	'stone'
	f.	dîmáat bird:SG	dົ່ມdົ້ມກ bird:PL	'bird'

Possessive suffixes are used with inalienably possessed nouns, such as body part nouns. Thus, the paradigms in Table 1 show the possessive inflection of the singular and the plural of the word for 'thigh'. As seen here, there is no distinction between inclusive and exclusive in first person plural possessive suffixes. Note also that the possessive suffixes express not only the person and number of the possessor, but also the number of the possessee.³ Thus, the possessive suffixes begin with a velar stop when the possessee is plural. Moreover, there is evidence that the singular possessee suffixes underlyingly begin with an alveolar stop /d/ after monosyllabic stems, cf for instance $z\delta$ 'chest', $z\delta$ - $d\tilde{n}$ 'my chest'; thus, the /b/ in the singular possessee suffixes shown in Table 1 is probably the manifestation

³ This feature of possessive markers is something which Kurmuk shares with some other Nilotic languages. Among the other Western Nilotic languages it is also found in Nuer (Crazzolara 1933: 67ff) and Dinka (Andersen 2002: 16f), and it is pervasive in the Southern Nilotic family (Rottland 1981 and 1982). Moreover, it is also found in some other Nilo-Saharan languages, for instance the Surmic languages, see Unseth's (1991) overview.

of an underlying /d/ which has assimilated to the stem-final consonant.⁴ The possessive markers cannot occur without an immediately preceding noun, into which they are fully integrated phonologically in terms of both segmental and tonal processes (cf e.g. Table 6 in section 4.2 below), so they are suffixes rather than enclitics or independent words.⁵

Table 1: I	Possessive Inflection of	of a Body Part Noun
$Possessor \downarrow$	Singular possessee	Plural possessee
	'thigh'	'thighs'
Unpossessed	?ллт	?λm-ín
1SG	?λ λ m-bίι	?àm-í-gíik
2SG	?óom-bú	?óm-ú- [↓] gúuk
3SG	?λλm-bί	?∧́m-í-⁺gíik
1PL	_	?ìm-í-gɔ́ək
2PL	_	?óm-ú-gùuk
3PL	_	?⁄im-í-gìn

Alienable possession is expressed by means of the genitive preposition ba~ $b\lambda$ 'of' followed by a possessor noun phrase after the possessee, as in (31). For some pronominal possessors, the genitive preposition merges with a special form of the personal pronoun, as in (32).

(31)	?⁄it house	bλ of	máa∫ fire			'kitchen'	
	zúuz - find -	ύ PST	ŋìır knife	bà of	dáaní∫ 3SG	'He/She found his/her knife.'	

 $^{^4}$ Thus, the number marking of the possessee is cognate with the marking that is used in Nuer and Dinka, whose possessive markers begin with /d/ for a singular possessee and /k/ for a plural possessee.

⁵ In this way they differ from the possessive markers in Dinka, which are enclitics (Andersen 2002: 16f).

(32)	púrí cloth	[↓] báar of:1SG	?úl - [↓] ⁄nKí be.black-PRED	'My cloth is black.'
	?ìm PRO:SG	bíir of:2SC	?ínzí G ID3	'That is yours.'

3. Syllable Structure and Word Shapes.

Kurmuk has the following eight syllable types: *CV*, *CVV*, *CVC*, *CVVC*, *V*, *VV*, *VC* and *VVC*. Monosyllabic words normally begin with a consonant, as exemplified by the nouns in (33). Most monosyllabic words also end in a consonant, as in (33b) and (33d), the word shapes *CV* and *CVV* mainly being restricted to function words, as in (34).

(33)	a. CV	zś	'chest'
	b. CVC	kừt	'rain'
	c. CVV	rèe	'thirst'
	d. CVVC	рл́лт	'mountain'
(34)	CV	kà	(preposition)
	CVV	ŋòo	'what' (interrogative)

Syllables without an initial consonant (V, VV, VC and VVC) occur only word-initially, and those with a long vowel (VV and VVC) only in phonological words consisting of two or more coalesced function words, see below. In general the syllable types V and VC occur only in phonological words with more than one syllable. They are found in many nouns that begin with a low-toned short /a/, as in (35), and many of these seem to be loanwords borrowed from the neighbouring language Berta, some in turn being borrowed from Arabic (Andersen 1993: 43).

(35)	a.	àgúurú	'cloud', cf Berta à <i>g</i> úurù
	b.	àndòlòolò	'ram'
	с.	à∫ìndúuk	'box', cf Berta <i>àssàndûuk</i> ', from Arabic <i>s^sanduug</i>
	d.	àlgálám	'pen', cf Berta <i>àlgálàm</i> , from Arabic <i>galam</i>

The syllable types V and VC also occur in a few monosyllabic function words, and this may be the reason for their deviant shape. The particles \dot{a} of near future and \dot{ay} of distant future only occur immediately before a verb, as in (36), so they

are bound morphemes, and they might therefore be considered to be prefixes; but unlike the suffixes, they are not phonologically integrated in the verb. Thus, they are tonally invariant, whereas the underlying tones of verbal suffixes may depend on the tonal class of the verbal root, see 6.7 below. Similarly, the preverbal particles, unlike suffixes, are not involved in any segmental processes that may take place in a verb, such as vowel harmonization, see 4.2 below. Since their phonological status is thus neither that of a phonological word nor that of an affix, they should probably be categorised as clitics, but I have made the arbitrary decision not to indicate this, and transcribe them as words.

(36)	á FUT1	i ?ám [↓] dúb⊼n iUT1 eat polenta		'He/She is going to eat polenta.'		
	áy FUT2	?àm eat	ďúb∧n polenta	'He/She will eat polenta.'		

Other V and VC function words are the personal pronouns à 'I', i 'you' (2SG), i 'we' (1PLIN) and in 'we' (1PLEX). Like the other monosyllabic personal pronouns, wi 'you' (2PL) and $g\lambda$ 'they', they are also restricted to occurring in preverbal position, either immediately before the verb, as in (37a), or coalescing with a following particle, as in (37b-c). In (37b) the pronoun à coalesces with the negation particle áná, which creates a VV syllable, and in (37c) it coalesces with the distant future particle áy, which creates a VVC syllable. Like the future tense particles, the monosyllabic personal pronouns are bound morphemes in the sense that they are not citation forms, and unlike the subject suffixes they are tonally invariant underlyingly and could therefore be categorized as clitics. The corresponding citation forms of the personal pronouns are disyllabic, and they are not vowel-initial, but begin with a glottal stop: 2ianif 'I', 2iinif 'you' (2SG), 2ingif 'we' (1PLIN), 2inis 'we' (1PLEX).

(37)	a. í 1PLIN	?ám ↓ eat p	dúbán olenta	'We are eating polenta.'
	b.à -an ISG-no	á ?∕n -↓t t eat -A	ýi P	'I am not eating.'
	c.á -a 1SG -F	y ?àm UT2 eat	dúbán polenta	'I will eat polenta.'

There seem to be no further restrictions on the combination of syllable types within a word. For instance, all logically possible combinations of the four syllable types *CV*, *CVC*, *CVV* and *CVVC* have been attested in disyllabic nouns, as illustrated in (38), where dots indicate syllable boundaries, while hyphens indicate morpheme boundaries. There can, for example, also be a sequence of four syllables with a long vowel, as in the verb form in (39), which constitutes a complete sentence.

(38)	CV.CV	∫îdî	'he-goat'
	CV.CVC	lèg -ìt teeth -SG	'tooth'
	CV.CVV	kày -áa sister-1	'my sister'
	CV.CVVC	∫àpúut	'cat'
	CVC.CV	bàrtì	'slave'
	CVC.CVC	∫∧́mpír	'mat'
	CVC.CVV	wàŋ -gíi eye -SG:1SG	'my eye'
	CVC.CVVC	wàț -kíik buttocks -PL:1SG	'my buttocks'
	CVV.CV	?úudú	'ostrich'
	CVV.CVC	táarák	'person'
	CVV.CVV	kìır -íı foot -SG:1SG	'my foot'
	CVV.CVVC	dîináa <u>t</u> bird:SG	'bird'
	CVVC.CV	kúuŋkí	'dough'
	CVVC.CVC	dùundùl	'chameleon'
	CVVC.CVV	tòoŋgáa	'locust'
	CVVC.CVVC	wìindùun	'magician'

(39) tʌ́ʌŋ-áad -ùud-ɛ́ε -r push -CP:CONT -PST -2PL -ASS 'You were pushing it hither.'

As seen above, a word consists of a root and zero or more suffixes, while there are no true prefixes. Virtually all verbal roots are monosyllables with the shape CV(V)C, but verb forms may consist of up to at least five syllables, as in the sentences in (40).

(40)	?ám -ád - [↓] úut -í - [↓] wέε eat -HAB -PST -PASS -1PLIN	-r N -ASS	'We used to eat it.'
	tʌʌŋ -áad -ùud -íkí -r push -CP:CONT -PST -3PL -AS	S	'They were pushing it hither.'
	púr -úz - [↓] úud -ónò hoe -BEN -PST -1PLEX f	wàŋ field	'We hoed the field for him/her.'

Many morphologically simple nouns are monosyllables with the shape CV(V)C like verbal roots; but there are also many simplex nouns with more syllables.

4. Vowels.

4.1. Inventory and distribution of vowels. Kurmuk has ten vowel qualities, and they are divided into two symmetrical sets distinguished by the feature [ATR] (Advanced Tongue Root) as indicated in Table 2. For all ten qualities there is a binary length contrast between short and long.⁶ In monosyllabic words, however, the mid [+ATR] qualities [e] and [o] are very rare. They do not occur in monosyllabic verb forms, and they have only been attested in two words that are not function words, viz. the noun $m\partial o$ 'beer' and the numeral $d\partial of$ 'five', so they have at the most a marginal phonemic status, see below. The occurrence of the other eight vowel qualities and their two lengths in monosyllables are exemplified in Table 3 with singular nouns.

Table 2:	Vowel Q	ualities					
	[-/	ATR]			[+A	TR]	
high	Ι		U	i			u
mid	3	э			(e)	(0)	
low	ä	a			Λ		

⁶ When I mention vowel qualities irrespective of vowel length, I use single vowel symbols, without implying that the vowels are short.

Table 3:	TI	he Eight	Basic Vowel Q	ualities in I	Monosyll	labic Nouns
	$ \mathbf{I} $	bìl	'iron'	/11/	у́пţ	'well'
	/ɛ/	ţέl	'lower leg'	/88/	mèek	'spider'
[-ATR]	/a/	pál	'navel'	/aa/	máa∫	'fire'
	/3/	tốŋ	'spear'	/၁၁/	?òɔŋ	'frog'
	/υ/	kùţ	'rain'	/ບບ/	tùul	'child'
	/i/	kí∫	'bee'	/ii/	kìi∫	'orphan'
[+ATR]	/_/	?ńt	'house'	///	рл́лт	'mountain'
	/u/	pú∫	'grave'	/uu/	lúum	'grass'

In many function words and suffixes there is free variation between the short low vowels [a] and [Λ], as exemplified in (41).

(41)	ŋà ~ ŋλ	(preposition, 'by')
	bà ~ bà	(preposition, 'of')
	kà ~ kà	(preposition, 'with')
	wàlá ~ wàlá	(Prohibitive)
	-a \sim - Λ	(1 st person singular subject)
	$-at \sim -\Lambda t$	(Habitual)
	-ákí ~ - Λ kí	(Predicative)

But in (monosyllabic) roots which are not function words, there clearly is a contrast between the low qualities [a] and $[\Lambda]$, whether short or long, as illustrated by minimal pairs in (42).

(42)	[a]		[Λ]	
	kàal	'cattle enclosure'	kàal	'hole'
	?àam	'left hand'	?ллт	'thigh'
	nàk	'taste' (tr. verb)	nλk	'kill, beat' (tr. verb)

The vowel qualities [e] and [o] do occur in root position in nouns and verbs with more than one syllable, but normally only if the vowel of the following syllable is a high [+ATR] vowel, as in the morphologically simple disyllabic nouns in (43) and the morphologically complex disyllabic nouns in (44).

(43)	kòdí béekúm	<pre>'stick' 'monkey species'</pre>
(44)	a. lèg -ì <u>t</u> teeth -SG	'tooth'
	b. <u>t</u> èel -ìn lower.leg -PL	'lower legs'
	c. ?ókúr chicken:PL	'chickens'

In such words the mid [+ATR] qualities [e] and [o] are distributional variants of the mid [-ATR] qualities ϵ / and δ /, brought about by regressive [ATR] assimilation, see section 4.2 below; or [o] is a rounded variant of Λ / conditioned by a following [u], as in (44c), see section 4.3 below. However, [e] and [o] also occur in some words in which those conditions do not obtain. Thus, there are monosyllables with [e] and [o], as in (45), and there are words with more syllables in which [e] and [o] are not followed by λ /i/ or λ , as illustrated in (46). In such words, which seem to be rather few, [e] and [o] must probably be analysed as having a separate phonemic status.

(45)	tèe	'why' (interrogative)
	mòo	'beer'
	dool	'five'
	ŋòo	'what' (interrogative)
	kóon	'other'
(46)	àndòlòolò	'ram'
	múkúl↓ée	'maize'
	dórée	'hammer'

4.2. [ATR] harmony. In monomorphemic nouns with more than one syllable, all vowels normally belong to the same [ATR] set, except that the low [-ATR] quality [a] also co-occurs with the [+ATR] qualities [i], [u] and [Λ]. In the examples given in (47), all the vowels belong to the [-ATR] set, and in (48) they all belong to the [+ATR] set. The examples in (49) show that [a] can co-occur with [+ATR] vowels.

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- (47) k $\hat{r}p\hat{\epsilon}$ 'boat' 'cock' dóngól kúrót 'play ground' 'blacksmith' qùuzím kíďí∫ 'pot type' kúutár 'pig' kábíl 'sheep' (sg.) 'broom' ſılkát
- (48) búurí 'twin'
 kúlár 'porcupine'
 yáλľí∫ 'python'
 múumúl 'diviner'
 táλkál 'vulture'
- (49) ∫àrí 'ghost'
 zàagúl 'worm'
 àbùurà 'buffalo'
 àlbàambáy 'sweet potato species'

Two exceptions have been encountered: in the nouns in (50) the [+ATR] quality [u] co-occurs with the [-ATR] quality [I].

(50)	púrí	'cloth'
	rúnzí	'rainbow'

In words with suffixes that contain a vowel, the situation is more complex. To some extent, there is vowel harmony based on the [ATR] feature across morpheme boundaries within a word.⁷ In this respect the suffixes fall into four classes:

⁷ [ATR] harmony is a feature of Nilotic languages in general, thus occurring in all three main branches of this language family, viz. Western Nilotic, Eastern Nilotic and Southern Nilotic. The vowel harmony in Bari, an Eastern Nilotic language, was already described by Spagnolo (1933), and further studies of vowel harmony in this language are Hall & Yokwe (1978) and Steinberger & Vago (1987). The vowel harmony in Turkana, another Eastern Nilotic language, was first described by Dimmendaal (1983) and has subsequently been discussed by Vago & Leder (1987) and Noske (1990, 1996). As for Southern Nilotic languages, see

Class 1: Suffixes which are invariably [-ATR] and which do not affect the quality of preceding vowels.

Class 2: Suffixes which are invariably [+ATR] and which spread this feature to preceding non-low [-ATR] vowels.

Class 3: Suffixes which vary between [-ATR] and [+ATR] in harmony with the preceding vowel.

Class 4: Suffixes which vary between [-ATR] and [+ATR], but where the direction of the harmonization is dependent on the height of the root vowel.

These four classes will be dealt with in turn.

Class 1 suffixes have a [-ATR] vowel which does not vary with the corresponding [+ATR] vowel and which does not affect the quality of preceding vowels. The majority of suffixes belong to this class. As exemplified below, all of the five [-ATR] qualities, except [υ], have been attested in such suffixes.

An invariable /I occurs for instance in the passive suffix -(C)*I*. Table 4 shows this suffix after stems with each of the eight root vowel qualities.

Table 4:	The	e Passive	Suffix -(C)/ After Stems With Each of the
	Eig	ht Root V	Vowel Qualities
	/ I /	lìm-pì-r	'dig'
	/ɛ/	mèn-tì-r	'twist'
[-ATR]	/a/	?àm-pì-r	'eat'
	/ɔ/	kốɔ-∫í-r	'take'
	/υ/	pùt-ì-r	'wash'
	/i/	píin-ti-r	'encircle'
[+ATR]	/Λ/	nàk-ì-r	'beat, kill'
	/u/	kù∫-ì-r	'not know'

Rottland (1982) and for instance Creider & Creider (1989). Most of the Western Nilotic languages also exhibit [ATR] harmony, see for instance Tucker (1994) on Dholuo, Lojenga (1991) on Alur, Noonan (1992) on Lango, Andersen (1989) on Päri, Reh (1996) on Anywa, Gilley (1992) on Shilluk, Andersen (1999c) on Mayak, and Andersen (2006) on Jumjum. A few Western Nilotic languages are devoid of vowel harmony, including Dinka (Andersen 1987) and Mabaan (Andersen 1999b), but this is an innovation. Another suffix with an invariant [-ATR] vowel is $-(C)\partial n$, which forms a singular participle from transitive verbal roots. As illustrated in (51), the vowel of the suffix is [5] both after the [-ATR] stem $p\acute{e}l$ - and after the [+ATR] stem $n\acute{u}r$ -.

(51)	kòokóok meat	?á be	⁺pél -gón roast -PTCPL:SG	'The meat is roasted.'
	dúb⁄n polenta	?à be	?úr -gón stir -PTCPL:SG	'The polenta is cooked.'

An invariable /aa/ occurs in the singulative suffix *-aat*, and an invariable / $\epsilon\epsilon$ / in the 2nd person plural subject suffix *-\epsilon\epsilon*, as seen in (52) and (53), respectively.

(52)	Singular	Plural	
	bèel-áa <u>t</u>	béel	'cane'
	bùur-àaț	búur	'mushroom'
(53)	bùd -ée		'Run!'
	run -2PL		
	?ùr -ée		'Stir!'
	stir:AP-2PL		

Suffixes of Class 2 have an invariably [+ATR] high vowel. They impose their [ATR] value on preceding non-low [-ATR] vowels, as exemplified by the 2^{nd} person singular subject suffix -*i* in Table 5 and the 2^{nd} person singular possessive suffix -(C)*u* in Table 6. In this way the non-low [-ATR] qualities /1, ε , σ , σ / are realized as [i,e,o,u], while the low [-ATR] quality /a/ is left unaffected.⁸

⁸ It is not clear whether a Class 1 suffix can be followed by a Class 2 suffix and then undergo harmony.

Table 5:	Vowel Harmony Imposed by the 2 nd Person Singular				
	Su	bject Suf	ffix <i>-i</i>		
		Stem	2SG form		
	/ I /	?íɪd-	?íid-í-r	'cut' (multiplicative stem)	
	/ɛ/	gèp	gèb-í-r	'cut'	
[-ATR]	/a/	?àm	?àm-í-r	'eat'	
	/၁/	kóəy	kóy-í-r	'take'	
	/ʊ/	rùuț	rúu <u>d</u> -í-r	'transplant'	
	/i/	wík-	wík-í-r	'throw' (centrifugal stem)	
[+ATR]	/Λ/	?ìt	?àɗ-í-r	'pull'	
	/u/		(unattested)		

Table 6:Vowel Harmony Imposed by the 2nd Person Singular
Possessive Suffix -(C)u

		Stem	2SG form	
	/I/	kìır	kíir-ú	'leg, foot'
	/ɛ/	ţźl	tèl-ú	'lower leg'
[-ATR]	/a/	gáalát	gáaláٍt- [↓] ú	'hand'
	/၁/	dəəl	dóol-ú	'anus'
	/ʊ/	ţúk	t∕úg-ú	'mouth'
	/i/	lègìț	lègìt្-ú	'tooth'
[+ATR]	/Λ/	?ллт	?óom-bú	'thigh'
	/u/	?ùuŋ	?úuŋ-gú	'knee'

In Class 3 suffixes the vowel varies between [-ATR] and [+ATR] in harmony with the root vowel. Some of these suffixes are productive, but only occur after roots with one of the following five vowel qualities: the high [-ATR] vowels /I,U/ and the [+ATR] vowels /i,A,U/. Thus, these suffixes only occur after verb roots that have undergone Vowel Quality Shift, see section 4.4 below. One example is the antipassive suffix -(C) $i \sim$ -(C)i, as illustrated in Table 7. While Class 1 suffixes are underlyingly [-ATR] and Class 2 suffixes underlyingly [+ATR], Class 3 suffixes may be taken to be underlyingly unspecified for [ATR].

Table 7:		The Antipassive	$c \text{ Suffix -(C)} \sim -(C)i$
[-ATR]	/I/	gìp-í-r	'He/She is cutting'
	/ʊ/	lùț-i-r	'He/She is pulling'
	/i/	lìk-í-r	'He/She is breaking (something)'
[+ATR]	$/\Lambda/$?ìm-bí-r	'He/She is eating'
	/u/	pùt-í-r	'He/She is washing (clothes)'

Other suffixes which exhibit the same kind of variation, but which are possibly not productive, are for instance the plural noun suffix $-it \sim -it$, as in (54), and the singulative noun suffix $-at \sim -At$, as in (55).

(54)		Singular	Plural	
	/I/	ŋìɪr	ŋír-ít	'knife'
	/a/	kàal	kál-ít	'garden'
	/၁/	bòom	bóm-ít	'throwing stick'
	/i/	bíiŋ	bíŋ-íţ	'hide'
	/_/	рл́лт	pám-ít	'mountain'
	/u/	túuŋ	túŋ-íț	'horn (as musical instrument)'
(55)		Singular	Plural	
	/I/	píd-át	pít	'shell'
	/a/	wár-át	wár	'shoe'
	/υ/	kúm-át	kúm	'egg'
	/i/	tíd-á <u>t</u>	tít	'witch-doctor'
	/Λ/	?àʌw-àṯ	?а́лw	'bone'

Class 4 includes the past tense suffix. This suffix has several allomorphs, but most of them contain a short or long [u] or [υ]. Table 8 illustrates the distribution of [u] and [υ] after simplex transitive stems in sentences like (56b), which is the past tense counterpart of the present tense sentence (56a).

(56)	a.	à 1SG	bóor ďέεl skin goat		'I am skinning a goat.'
	b.	à 1SG	bóor <i>-</i> ú skin -PST	dềɛl goat	'I skinned a goat.'

Table 8:		The Past Tense Suffix -u ~ - U After Simplex Transitive					
		Stems					
		Present	Past				
	/1/	wìiw	wínw-ú	'lose'			
	/ɛ/	′ yὲ∫	yéz-ú	'tear'			
[-ATR]	/a/	′ ŋàl	ŋál-ú	'gnaw'			
	/3/	bóor	bóor-ú	'skin'			
	/U/	/ nùn	nún-ú	'fold'			
	/i/		(unattested)				
[+ATR]	/Λ/	/ ?àt	?óɗ-ú	'pull'			
	/u/	⁄ <u>t</u> ù∫	ţúz-ú	'send'			

As seen in Table 8, the [-ATR] quality /u/ occurs if the preceding vowel is a high [-ATR] vowel, i.e. /I/ or /u/, while the [+ATR] quality /u/ occurs elsewhere. Thus, /u/ is used not only after underlying [+ATR] qualities, but also after non-high qualities that are underlyingly [-ATR], i.e. after / ϵ /, /a/ and /ɔ/. In the latter case, the mid vowels / ϵ / and /ɔ/ are realized phonetically as [e] and [o]; that is, they harmonize with the following /u/. Since the past tense suffix is [+ATR] after nonhigh root vowels that are underlyingly [-ATR], it must be taken to be [+ATR] underlyingly like Class 2 suffixes. But it differs from Class 2 suffixes in that it harmonizes with high [-ATR] root vowels. Thus, this suffix triggers regressive [+ATR] harmony after mid root vowels, but progressively undergoes [-ATR] harmony after high root vowels. In this way it exhibits a mixture of two types of vowel harmony: [+ATR]-controlled and root-controlled. The past tense suffix is possibly the only member of Class 4. In principle, however, those Class 3 suffixes which only occur after the shifted root-vowels /I,u,i,A,u/, as in Table 7 above, could also be taken to belong to this class.

In (57a) the past tense suffix is followed by the Class 1 suffix -I (3rd person singular subject), and again it is [-ATR] after a high [-ATR] root vowel. In (57b), by contrast, the past tense suffix is followed by the Class 2 suffix -i (2rd person singular subject), and this suffix spreads its [+ATR] feature to both of the preceding vowels.

(57) a. gíīb -úd -í -r cut:M -PST -3SG -ASS 'He/She cut it.'

b. gíib -úd -í -r cut:M -PST -2SG -ASS 'You cut it.'

The past tense suffix may be preceded by a suffix with the quality /a/, as in (58), and in that case the root vowel is not affected by the past tense vowel. Thus, /a/ is a so-called opaque vowel (Steinberger & Vago 1987: 361), blocking the spreading of [+ATR].

(58)	gèb -àḏ	-ùud -í	-r	'He/She was cutting it.'
	cut -CONT	Г -PST -3S	G-ASS	

4.3. Rounding of /A,AA/. The low [+ATR] vowels /A,AA/ are (optionally, but normally) rounded to [0,00] when the following syllable contains the rounded quality /u/, as seen in (59)-(60). The forms in (59) show that the second person singular possessive suffix -(C)*u* has this effect. The root vowel of the word for 'thigh' is underlyingly /AA/, as shown by the suffixless form in (59a). As seen in (59b), the third person singular possessive suffix -(C)*u* has no effect on the root vowel, but before the suffix -(C)*u* the root vowel surfaces as [00], as seen in (59c).

a.	?ллт		'thigh'
b.	?́ллт	-bí	'his thigh'
	thigh	-SG:3SG	
c.	?óom	-bú	'your thigh'
	thigh	-SG:2SG	
	а. b. c.	 a. ?λ̄λm b. ?λ̄λm thigh c. ?óom thigh 	 a. ?λ̄ʌm b. ?λ̄ʌm -bí thigh -SG:3SG c. ?óom -bú thigh -SG:2SG

The past tense suffix -u has the same effect, as seen in (60). In (60a) the suffixless verb form $2\lambda t$ has the root vowel $/\Lambda/$; but before the past tense suffix in (60b), the root vowel is realized as [0].

(60)	a.	<u>t</u> áarák person	?Àt wìn pull ropes	-ìț -SG	'The man starts pulling the rope.'
	b.	táarák person	[↓] ?óɗ -ú pull -PST	wìn -ì <u>t</u> ropes-SG	'The man pulled the rope.'

No rounding takes place if another vowel intervenes between $/_{\Lambda}/$ and $/_{u}/$, as seen in the verb form in (61). Here there is a suffix vowel /aa/ between the root vowel $/_{\Lambda\Lambda}/$ and the suffix vowel /uu/.

 (61) táarák ¹tánŋ - áad - ¹úu gúr - ít person push -CP:CONT-PST stone -SG
 'The man was pushing a stone hither.'

However, a short suffix vowel /i/ assimilates to a long /uu/ of a following suffix, and in that case the root-vowel quality $/\Lambda$ / is rounded, as seen in (62)-(63). The noun forms in (62) contain a plural suffix, which is *-in* in the unpossessed form in (62a). Before a possessive suffix this plural suffix is reduced to *-i*, as seen in (62b) before the 3rd person singular suffix *-guk*. In (62c) the reduced plural suffix is followed by the 2nd person singular suffix *-guuk*, and it assimilates to this suffix with the result that the vowel $/\Lambda$ / in the root $2\Lambda m$ - undergoes rounding to [0].

(62)	a.	?λm -ín	'thighs'
		thigh -PL	
	b.	?∕im -í -⁺gíuk	'his thighs'
		thigh -PL-PL:3SG	
	c.	?óm -ú -⁺gúuk	'your thighs'
		thigh -PL-PL:2SG	

The same phenomenon is illustrated by the verb forms in (63). In (63a) the root $\int \Delta A p$ - is followed by the benefactive suffix *-iz*-. In (63b) the latter is followed by the past tense suffix *-uud*-, to which it assimilates, whereby the root surfaces as [$\int oop$].

- (63) a. táarák [↓]∫∧Λp-íz -á kòokóok
 person cook -BEN -1SG meat
 'I am cooking meat for the man.'
 - b. táarák [↓]∫óop-úz -úud-à kòokóok person cook -BEN -PST -1SG meat 'I cooked meat for the man.'

4.4. Vowel Quality Shift. In addition to phonologically conditioned variation in vowel quality, there is also a recurrent, but grammatically conditioned, set of alternations in the vowel quality of roots. This set, which is shown in Table 9, will be referred to as Vowel Quality Shift, and it is exploited in verbal derivation and in number inflection of nouns. As shown in the table, it consists in an alternation between a basic vowel quality and a shifted vowel quality. Only basic vowels

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which are [-ATR] are affected, and the corresponding shifted vowels are either [+ATR] with the same height or [-ATR] with a different height. Thus, the high and low vowels are shifted to [+ATR], while the mid vowels ϵ , σ / are shifted to the high vowels / ϵ , σ /.

Table 9:	Vowel	Quality Shift
	Basic	Shifted
	Ι	i
	3	I
[-ATR]	а	Λ
	э	U
	U	u
	i	i
[+ATR]	Λ	Λ
	u	u

This grammatically conditioned set of root vowel alternations is also found in the closely related language Mayak. As has been argued for that language (Andersen 1999c), Vowel Quality Shift can be explained historically as reflecting a former [ATR] alternation which has been obscured by mergers in the original Proto-Western Nilotic vowel system, namely a merger of original */e/ and */o/ with original */I/ and */u/. Thus, the [-ATR] mid vowels / ϵ / and / σ / originally alternated with their [+ATR] counterparts */e/ and */o/, and later on */e/ and */o/ changed to /I/ and /u/.

Vowel Quality Shift is used systematically in the formation of several types of derived verb stems, for instance antipassive stems. As mentioned in section 2.3, an antipassive stem is an intransitive stem derived from a transitive root such that the logical object is removed from its valency. Thus, while the underived verb stem in (64a) takes an object, the corresponding antipassive verb stem in (64b) does not. Table 10 shows antipassive stems for all eight vowels of the corresponding roots. The forms given in the table are the ones used in present-tense sentences like those in (64).

(64)	a.	từul child	gèp cut	yáat tree	'The child is cutting the tree down.'
	b.	tùul child	gìp-í cut -A	-r P -ASS	'The child is cutting.'

Table 10	: Vowel	Quality Shi	ift in Anti	ipassive Stems	6
	Basic	Underived	Shifted	Antipassive	
	/1/	līm	/i/	lìm-bí-r	'dig'
	/8/	gèp	/1/	gìp-í-r	'cut'
[-ATR]	/a/	?àm	/_/	?ìm-bí-r	'eat'
	/3/	làt	/υ/	lùț-í-r	'pull'
	/υ/	pùt	/u/	pùt-í-r	'wash'
	/i/	pìn	/i/	pìn-zí-r	'wash hands'
[+ATR]	/_/	?àt	/_/	?àt-ı́-r	'pull'
	/u/	?úur	/u/	?úr-í-r	'stir'

Vowel Quality Shift is also used as part of one among several methods of number inflection of nouns. Thus, for many disyllabic noun stems the plural is formed from the singular in the following way:

- a. Long vowels are shortened.
- b. The first vowel undergoes Vowel Quality Shift.
- c. The second vowel becomes high and rounded, and it harmonizes with the first vowel for [ATR].
- d. The surface tone pattern becomes HH (as a manifestation of the underlying tone pattern HL, see section 6.3 below).
- e. $/\Lambda$ becomes [o] before /u/.

The resulting plural forms, which I call apophonated, share the template $C\dot{V}C(C)\dot{U}(C)$, where U is either /u/ or /u/. The first vowel of the template is either [-ATR] /I/9 or /u/, as in (65), or [+ATR] /i/, /u/ or / Λ /, as in (66). The vowel / Λ / becomes [o] before /u/, as in (66b-c), in accordance with the phonological rule of Rounding dealt with in section 4.3 above.

(65)	Singular	Plural	
	kòrpé	kúrpú	'boat'
	dángál	dúŋgúl	'cock'
	kòotàr	kútúr	'hoe'

⁹ The /1/ has not (yet) been attested in Kurmuk, but it is found in the closely related language Mayak, for instance in *rikut*, the plural of *rɛɛkat* 'pot type' (Andersen 1999c: 19).

	Singular	Plural	
a.	díwár	díwúr	'squirrel'
b.	gálám	gólúm	'kid'
c.	bàrtì	bórţú	'slave'
d.	gúďál	gúdúl	'bull'
e.	kúutár	kúţúr	'pig'
f.	púrí	púrú	'cloth'
	a. b. c. d. e. f.	Singular a. díwár b. gálám c. bàrţì d. gúdál e. kúuṯár f. púrí	SingularPlurala. díwárdíwúrb. gálámgólúmc. bàrţìbórţúd. gúdálgúdúle. kóuţárkúţúrf. púrípúrú

Vowel Quality Shift is also found in suffixed plural nouns with monosyllabic singular counterparts, but more sporadically, as in (67).

(67) Singul	ar Plural	
wiil	wil-in	'tail'
lấε∫	líız-íın	'elephant'
káak	kʌ́ʌg-ı́in	'snake'
ŋ ວ້ວໄ	ŋùl-úk	'limping'
từul	tùl-ìn	'child'
kaak ŋòəl tùul	кллд-шп ŋùl-úk tùl-ìn	'snake' 'limpin 'child'

5. Consonants.

5.1. Inventory and distribution of consonants. Kurmuk has 19 consonants, whose phonetic properties are indicated in Table 11.

Table II: Con	isonant	t Invent	ory					
	bi- labial	inter- dental	alve- olar	post- alve- olar	pala- tal	velar	labio- velar	glot- tal
voiceless stop	р	ţ	t			k		?
voiced stop	b	d				g		
implosive stop			ď					
voiceless fric.				ſ				
voiced fricative			Z					
nasal	m		n		ր	ŋ		
lateral			1					
trill			r					
glide					У		W	

Table 11. Commence 4 T-----4

There are pairs of voiceless and voiced stops in three places of articulation: bilabial [p,b], interdental [t,d] and velar [k,q]. Phonologically, the alveolar implosive stop [d] functions as the voiced counterpart of the voiceless alveolar stop [t], see 4.6 below.¹⁰ The voiced alveolar fricative [z] likewise functions as the voiced counterpart of the voiceless postalveolar fricative [[]. There are four nasals, and three of them, [m,n,n], have the same place of articulation as stops, whereas there are no stops corresponding to the palatal nasal [n]. Phonologically, however, the fricatives [f] and [z] parallel the stops, see section 4.6 below, so they fill this gap.¹¹ Functionally, therefore, the consonant system is organized as shown in Table 12, and this system is a typical Western Nilotic one.

Table 12:	System	it inven		rgamzet		onotogi	Cal
		bi- labial	inter- dental	alveo- lar	palatal	velar	glottal
obstruent	voiceless	р	ţ	t	ſ	k	?
	voiced	b	d	ď	Z	g	
	nasal	m		n	n	ŋ	
sonorant	lateral			1			
	trill			r			
	glide	w			у		

Table 12:	Consonant Inventory Reorganized as a Phonological
	System

¹⁰ The existence of an implosive consonant /d/ in Kurmuk and other Northern Burun languages makes this branch of Western Nilotic different from most other Western Nilotic languages, see Storch (2005: 76-93). But /d/ is also found in Alur (Ukoko et al. 1964) in the Lwo branch of Western Nilotic, where it contrasts with the plain stops /t/ and /d/, and Dimmendaal (1984, 1988) has provided evidence that the /d/ of this language goes back to Proto-Nilotic */d/. In Kurmuk, however, there is no voiced plain stop [d], and Kurmuk [d] corresponds to [d] in other Western Nilotic languages, cf. for instance Kurmuk $d\hat{\epsilon} el$ 'goat', Mabaan $d\hat{i} el A$, Päri *diel*; Kurmuk *dimáat* 'bird', Mabaan *díná*, Agar Dinka *dít*, Kurmuk *dîk* 'three', Mabaan $d_{AA}q_{P}$, Päri $\dot{a}^{\dagger}d\dot{a}q\dot{a}$, Agar Dinka $dy\hat{a}k$ (reconstructed as Proto-Nilotic * $d\ddot{a}k$ with */d/ by Dimmendaal (1988: 60)). Hence, [d] in Kurmuk (and other Northern Burun languages) is more likely to be an innovation than a retention from Proto-Nilotic.

¹¹The existence of fricatives is another feature that makes Kurmuk different from most other Western Nilotic languages, see Storch (2005: 76-93). The Kurmuk sibilants $/\int$ and /z/ correspond to the palatal stops /c/ and /i/ in Mayak cognates, as in Kurmuk kif 'bee', Mayak kic, and in Kurmuk $z\dot{z}$ 'chest', Mayak *jzk*. The use of [\int] and [z] in Kurmuk is possibly due to influence from the neighbouring language Berta, which has both of these fricatives, but not palatal stops, as core phonemes (Andersen 1993: 57).

Table 13 shows the distribution of the consonants in terms of three positions in a word. The voiceless obstruents, apart from [?], and the sonorants, apart from [n], all occur word-initially, intervocalically and word-finally. The voiced obstruents, on the other hand, occur word-initially and intervocalically, but not word-finally. Thus, there is no voice contrast in morpheme-final obstruents, whether the morphemes are roots or -(V)VC suffixes.

Two consonants have a more awkward defective distribution. The glottal stop [?] occurs only in word-initial position;¹² and the palatal nasal [ŋ] does not occur word-initially, but it occurs intervocalically and word-finally. Although, in this way, [?] and [ŋ] are in complementary distribution, they will not be considered variants of the same phoneme. Their defective distribution is due to two historical sound changes in root-initial position: Proto-Western Nilotic (PWN) */c/ has become /?/ in the Burun languages,¹³ and PWN */ŋ/ has become /y/ in the Northern Burun languages (Andersen 2006: 9-10).¹⁴

¹² The glottal stop exceptionally occurs in word-medial position in the interjection $\hat{\epsilon}?\hat{\epsilon}$ 'no'.

¹³The change */c/ > /?/ in Kurmuk (and in the Burun family as a whole) is attested by cognate series like the following: Kurmuk ?àak 'milk', Mabaan ?áaká, Päri càak, Agar Dinka cá; Kurmuk ?órók 'blind', Päri còor, Agar Dinka còor. But /?/ in Kurmuk also has another source, as attested by cognate series in which it corresponds to /?/ in Päri and to either [u], [w] or [y] in the Agar dialect of Dinka according to the quality of the following vowel. Thus, Agar Dinka has a velar approximant [u] before non-high vowels, a palatal approximant [y] before high front vowels, and a labio-velar approximant [w] before high back vowels, cf. Kurmuk ?àam 'thigh', Mabaan ?ámá, Päri ?àam, Agar Dinka ugaam; Kurmuk ?áaníŋ 'l', Päri ?áaní, Agar Dinka ugaêen; Kurmuk ?át 'house', Mabaan ?áná, Päri ?òtó, Agar Dinka ugèt; Kurmuk ?út 'oustich', Päri ?àudò, Agar Dinka wúut; Kurmuk ?ómbón 'nose', Päri ?úm, Agar Dinka wûm. Dimmendaal (1988:9f) suggested that this consonant goes back to a Proto-Nilotic */q/.

¹⁴The change */n/ > /y/ in Kurmuk is attested by cognate series like the following: Kurmuk *yáaŋ* 'crocodile', Mabaan *nâaŋà*, Päri *nàaŋ*, Agar Dinka *nậaŋ*; Kurmuk *yáʌlíf* 'python', Päri *nâʌlló*, Agar Dinka *nêeel*. But again, Kurmuk /y/ also has another source, as attested by cognate series in which it corresponds to /j/ in Mabaan and to /y/ in Päri: Kurmuk *yáaṯ* 'tree', Mabaan *jâanà*, Päri *yàaṯ*; Kurmuk *y5m* 'monkey species', Mabaan *jûuamà*, Päri *à*¹*yò5m*.

	Word- initial	Inter- vocalic	Word- final
р	+	+	+
ţ	+	+	+
t	+	+	+
ſ	+	+	+
k	+	+	+
b	+	+	-
d	+	+	-
ď	+	+	-
Z	+	+	-
g	+	+	-
m	+	+	+
n	+	+	+
ր	-	+	+
ŋ	+	+	+
1	+	+	+
r	+	+	+
у	+	+	+
W	+	+	+
?	+	-	-

Table 13:Distribution of Consonants

5.2. The pair $/\int_{\mathbf{x}/\mathbf{x}}$. Although $/\mathbf{z}/$ is the voiced counterpart of $/\int_{\mathbf{x}/\mathbf{x}}$ is point of articulation is different: $/\mathbf{z}/\mathbf{x}$ is alveolar, while $/\int_{\mathbf{x}/\mathbf{x}}$ is postalveolar. This difference has a consequence after the palatal nasal $/\mathbf{n}/\mathbf{x}$ as seen in the verb forms in (68)-(69). The root-final consonant of the verbs in question is underlyingly a palatal $/\mathbf{n}/\mathbf{x}$ as evidenced by the (a)-clauses, where the consonant is palatal in intervocalic position and in word-final position, respectively. $/\mathbf{z}/\mathbf{x}$ changes the preceding palatal $/\mathbf{n}/\mathbf{x}$ to an alveolar [n], as in the (c)-clauses, while $/\int_{\mathbf{x}/\mathbf{x}}$ does not, as in the (b)-clauses.

- (68) a. mí -n góon -á [↓]∫ákál woman -SG scratch -CONT pot
 'The woman is scratching the pot.'
 - b. ∫ákál ¹góoŋ ∫í ŋλ mí -n
 pot scratch -PASS by woman -SG
 'The pot is being scratched by the woman.'

	c.	∫ákál ^{pot} 'The	l [↓] gốc scrat pot is b	on -z ch -CF eing so		át CONT hed by	-ì -PASS the wo	ŋλ S by oman.	mí woman	-n -SG
(69)	a.	tùul child	kàŋ pick.up	dùlg money	-ìn 7 -PL		'The	child	is picki	ng money up.'
	b.	ŋòo what	kàŋ pick.up	-∫Ì -PASS	ŋà S by	từul child	ʻWh	at is t	eing pic	ked up by the child?'
	c.	tùul	kìn	-zí	-r		'The	child	l is picki	ng up.'

-ASS

child pick.up -AP

5.3. The glottal stop /**?**/ and vowel coalescence. Since the glottal stop [?] only occurs word-initially, it might be suggested that it is just a possible manifestation of the absence of a consonant, i.e., that words with alleged /?/ actually begin with a vowel. However, the glottal stop differs from the absence of a consonant, as evidenced by the possibilities of vowel coalescence. A word-initial vowel may coalesce with a preceding vowel, see (70). In (70a) the initial /a/ of the borrowed noun $\frac{\partial lg}{\partial l dm}$ 'pen' coalesces with the /a/ of the preceding preposition $b \dot{a}$ 'of' into one long vowel [aa]. In (70b), similarly, the pronoun \dot{a} 'I' coalesces with a glottal stop, no coalescence takes place. In (71), for instance, there is a phonetically prominent [?] between the pronoun \dot{a} and the /a/ of the following verb stem.

(70) a. táarák ?òt-í ?í bà-algálám person put -CF PRO:PL of -pen
'The man is paying for the pen.' Lit. 'The person is putting those (i.e. the money) of the pen.'

b. à ?óok -úd -^ríkí ŋà -a ?àm kòokóok
 1SG see:CF -PST -3PL while-1SG eat meat
 'They saw me eating meat.'

(71) à ?àm dúbán 1SG eat polenta 'I am eating polenta.' The copulative verb $2a(g_{-})$ 'be' begins with a glottal stop, as seen in its past tense form in (72). But in its non-past tense form 2a, the glottal stop is often elided after another word. This elision may occur whether the preceding word ends in a consonant, as in (73a), or in a vowel, as in (73b-c). In the latter case the elision is accompanied by vowel coalescence, a^2a' and i^2a' being realized as $aa and i^2$.

(72)	táarák person	[↓] áná not	?ág -ú be -PST	[↓] ?úr -5k blind -SG	'The man was not blin	ıd.'
(73)	a. à 1SG 'I ar	wàaŋ ^{burn} n burnin	kízúk leaves ng the dry l	?ìk -à PRO:PL -be leaves.'	?ìw -íin dry -PTCPL:PL	
	b.à 1SG 'I ar	-a b -be a n afraid	òr -òk fraid -SG l.'			
	c. ì 2SG	-i bà -be afi	or -òk raid-SG			

'You are afraid.'

5.4. Glide insertion. If a vowel-initial suffix is added to a vowel-final stem, a glide may be inserted between the two vowels: [w] after a rounded vowel, [y] after an unrounded vowel. Glide insertion, which prevents hiatus, has been attested between noun stems and the plural suffix *-aak*, as in (74), and between the centripetal suffix *-u* and the 2^{nd} person plural subject suffix *-\varepsilon*, as in (75).

(74)	<i>Singular</i> àn <u>d</u> òlòolò kòdí àbùurà	<i>Plural</i> àngòlòolò -w -áak kógí -¹y -áak àbùurà -y -áak	'ram' 'stick' 'buffalo'
(75)	?òd -ú -w -ée go -CP -2PL		'Come!'

5.5. Heterosyllabic clusters. Two consonants may be adjacent across a syllable boundary within a word. On such heterosyllabic clusters the following observations can be made:

- a. The first consonant is a sonorant, whether a nasal, a liquid or a glide.
- b. The second consonant is normally an obstruent. Words in which the second consonant is a sonorant are probably all loanwords, such as nouns of Arabic origin which begin with /àl/, in Arabic the definite article.
- c. Nasal plus obstruent are mostly homorganic, and always so in verbs.
- d. The two consonants are often heteromorphemic, and always so in verbs.

The consonant clusters attested thus far in words that are not of Arabic origin are exemplified in Table 14. Additional clusters occurring in nouns of Arabic origin are for instance /lm/, /lb/ and /lp/, as in *àlmáafik* 'tongs type', *àlbáal* 'attention' and *àlpúul* 'bean'.

	Consonant Clusters					
/mb/	kámbál	'girl'				
/mp/	?àm-pì -r	'It is being eaten.'				
	eat -PASS -ASS					
/md/	yúm -dán	'monkeys'				
	monkey.species -PL					
/mg/	kùm -gíik	'my kidneys'				
	kidneys-PL:1SG					
/nd/	rún -dʌ́n	'years'				
	year -PL					
/nt/	?ónțál	'cotton'				
/nd/	?ìn -ɗináat	'intestine'				
	intestines -SG					
/nt/	mèn -tì -r	'It is being twisted.'				
	twist -PASS -ASS					
/nz/	rúnzí	'rainbow'				
/ng/	mèn -gòn	'twisted'				
	twist -PTCPL:SG					
/ŋ∫/	kàn -∫ì -r	'It is picked up.'				
	pick.up-PASS -ASS					
/ŋg/	mùŋgòn	'name'				
/ŋk/	bílíŋkì∫	'bat'				

Table 14: Heterosyllabic (Homomorphemic or Heteromorphemic) Consonant Clusters

/l <u>d</u> /	gìl -dín	'lions'
	lion -PL	
/lt/	kàl-tì -r	'It is stolen.'
	steal-PASS -ASS	
/lg	kòlgón	'fat'
/lk/	∫ílkát	'broom'
/rb/	àbúrbútù	'butterfly'
/rp/	kòrpé	'boat'
/rd/	wìr -dín	'rivers'
	river -PL	
/rt/	bàrtì	'slave'
/r∫/	?èr -∫ì -r	'It is broken.'
	break-PASS -ASS	
/rg/	?èr -gòn	'broken'
	break-PTCPL:SG	
/rk/	kúrk-ón	'nail'
	nail -SG	
/yd/	bùy -dín	'ant-hills'
	ant.hill -PL	
/yɗ/	bày -ɗu	'my beard'
	beard-SG:1SG	
_/yg/	kóygót	'hunger for meat'
/wg/	?́ллw-ǵik	'his bones'
	bones -PL:3SG	

Basically, there are no geminate consonants in Kurmuk; but interdental [\underline{tt}] and [\underline{dd}] may arise as a result of optional deletion of the vowel in the past tense suffix *-ud-* ~ *-ut-* after roots ending in an interdental stop. Thus we get minimal pairs like those in (76)-(77), where the present tense form has a single [\underline{t}] or [\underline{d}], while the past tense form has a geminate [\underline{tt}] or [\underline{dd}]. See further in section 6.5 below.

(76)	múur gazelle.species	méț-ì lìi beat-PASS dead	1	'The gazelle is being killed.'
	múur gazelle.species	méț-ț -ì beat -PST -PASS	lìi dead	'The gazelle was killed.'

(77)	mòɔd -á brother-1	búd-ì run -ASS	'My brother is escaping.'
	mòod -á brother-1	búd_d_ì run_PST-ASS	'My brother escaped.'

5.6. Intervocalic voicing, assimilation, and degemination. As mentioned in section 5.1, there is no voice contrast in root-final obstruents. However, suffixation gives rise to voice alternation in such obstruents, and in at least some cases this alternation may be analysed as resulting synchronically from general phonological rules.

Root-final obstruents, which are voiceless in word-final position, sometimes undergo voicing in intervocalic position. This is what happens when an underlyingly vowel-initial suffix is added to a root, as illustrated in (78). In (78a) the verb form $d\hat{\epsilon}k$ consists of only a root, which ends in a voiceless obstruent /k/. When the past tense suffix -u is added, as in (78b), this /k/ undergoes voicing to [g].

(78)	a. <u>t</u> áarák person	dêk wìn -ì <u>t</u> tie ropes-SG	'The man is tying a rope.	
	b. <u>t</u> áarák person	[↓] dếg -ú wìn -ìț tie -PST ropes-SG	'The man tied a rope.'	

In Table 15, the past tense suffix -u is added to a verbal root for each of the 13 different consonants that can occur (underlyingly) root-finally. In Table 16, similarly, one of the plural suffixes -ak and -aak is added to a nominal root, which in this case is also the singular form. Roots ending in sonorants are included in both tables in order to show that there is no evidence for an underlying initial consonant in the suffixes, cf below. Note also the following changes in manner and place of articulation accompanying the voicing: The plain alveolar stop /t/ becomes implosive [d], and the postalveolar / \int / becomes alveolar [z].

Table 1	5: Intervocalic	Voicing Before	the Past Tense Suffix -u
	Non-past tense	Past tense	
/p/	gèp	géb-ú	'cut'
/ <u>t</u> /	yèț	yéd-ú	'cut'
/t/	pùt	púď-ú	'wash'
/ʃ/	?ù∫	?úz-ú	'suck'
/k/	dîk	dég-ú	'tie'
/m/	?àm	?ám-ú	'eat'
/n/	mèn	mén-ú	'twist'
/ɲ/	kàn	kán-ú	'pick up'
/ŋ/	wàaŋ	wáaŋ-ú	'light'
/1/	kàl	kál-ú	'steal
/r/	?èr	?ér-ú	'break'
/y/	kóoy	kóy-ú	'take'
/w/	wìiw	wínw-ú	'lose'

Table 16:	Intervocalic Voicing Before the Plural Suffixes -a	k
	and <i>-aak</i>	

	Singular	Plural	
/p/	dňýip	ɗʎyíb-⁺áak	'termite'
/t/	gốt	gód-ák	'adze'
/t/	kút	kúɗ-ák	'nest'
/ʃ/	kí∫	kíz-ák	'bee'
/ k /	?ńлk	?л́лд-л́к	'net'
/m/	?л́лт	?́ллт-ák	'magician type'
/n/	gàaríin	gáaríın-¹áak	'sword'
/ɲ/	kúubán	kúubáŋ- [↓] áak	'bark'
/ŋ/	∫àŋ	∫àŋ-àk	'donkey'
/1/	∫៱៱Ι	∫ก์∧l-ák	'garden'
/ r /	kúr	kúr-ák	'chair'
/y/	тлу	m⁄iy-ák	'dry season'
/w/	dáw	ďáw-ák	'monkey species'

However, some instances of root-final intervocalic voiced obstruents are not a result of intervocalic voicing. Thus, there is evidence that such consonants sometimes manifest an underlying cluster of two consonants. This is the case, for instance, in verb forms that consist of an underived intransitive stem and the assertive suffix, as in (79).

(79)	từul child	wêeg -ì cry -ASS	'The child is crying.'
	kámbál girl	[↓] mɛ́ɛl -í dance -ASS	'The girl is dancing.'
	táarák person	dım -bì spit -ASS	'The man starts spitting.'

Table 17:Combination of Underived Intransitive Verb Stems withthe Assertive Suffix

	Root	Root-ASS	
/p/	léep	léeb-í	'rain'
/t/	bùț	bù <u>d</u> -ì	'run'
/t/	kùut	kùuɗ-ì	'laugh'
/ʃ/	yÈ∫	yèz-ì	'get torn'
/k/	wèek	wèɛg-ì	'cry'
/m/	dìim	dìim-bì	'spit'
/n/	nínn	níın-di	'lie, sleep'
/ɲ/		(unattested)	
/ŋ/	wáaŋ	wáaŋ-gí	'burn'
/1/	méel	méel-í	'dance'
/r/	рл́лг	ρλη Γ -ί	ʻjump'
/y/	záay	záay-í	'speak'
/w/	ţùw	tùw-ì	'die'

As illustrated in (79) and as shown in Table 17, the assertive suffix has the form -i after root-final obstruents, liquids and glides, but a consonant-initial form -Ci after root-final nasals. In the latter case the initial consonant of the suffix is a voiced obstruent which is homorganic with the preceding nasal. While the surface forms thus suggest that the underlying consonant is an obstruent, they do not provide any clue as to any particular place of articulation for this consonant, so we may assume that it is underlyingly unspecified in this respect, but that it receives its place of articulation from the preceding nasal.¹⁵ The consonant-initial allo-

¹⁵Alternatively, given that the assertive suffix has the allomorph -r after vowels, cf section 2.4 above, one might speculate that the underlying initial consonant of the suffix is /r/.

morph of the suffix may be assumed also to underlie the *-i* allomorph that occurs after non-nasal consonants; and since root-final obstruents here surface voiced rather than voiceless, it may further be assumed that the suffixal consonant is underlyingly specified as [+voiced], symbolized C. When -Ci is suffixed to roots ending in a non-nasal consonant, the place and manner features of the latter are presumably spread to the underlying consonant C, which in turn spreads its [+voiced] feature to a preceding obstruent. The result of these processes are geminate consonants across the morpheme boundary, and all of them are then degeminated. Given these rules of Assimilation and Degemination, the verb forms in (79) are derived in the way shown in (80).

(80)	wêek-Çì	méel-Çí	dìım-Çì	Underlying representation
	wèɛg-gì	méel-lí	dînm-bî	Assimilation
	wèɛg-ì	méel-í	_	Degemination

The assumption of a general phonological rule of Degemination is compatible with the fact that there are no surface geminate consonants in Kurmuk, except for the interdentals [dd] and [tt] mentioned in section 5.5 above. Alternatively, one could assume that the assertive suffix has no initial consonant underlyingly after non-nasal consonants. In that case, the realization of root-final obstruents as voiced in Table 17 could be the same voicing process as that of Tables 15 and 16. However, there is external evidence for a degemination process, at least historically. Thus, in Surkum, another Northern Burun language, the suffixation of the assertive morpheme to an intransitive root results in geminate voiced consonants when the root-final consonant is not a nasal, as in $2\partial ab-b\hat{i}$ 'He/She is squatting', *làaj-j* \hat{i} 'He/She is urinating', *méɛl-lí* 'He/She is dancing,' and *2áar-rí* 'He/She is breathing'.

There is a further complication: The existence of the rule of Intervocalic Voicing does not preclude root-final voiceless obstruents from occurring in intervocalic position in the surface representation. For instance, they surface in such a position in the passive form of underived transitive verbs, as in (81c), which is a passive counterpart of the active sentence (81a). In the passive verb form $p \partial t - \dot{r} - \dot{r}$ in (81c), the root-final voiceless stop [t] occurs before the vocalic passive suffix - \dot{v} , while the root-final stop is a voiced [d] before the past tense suffix - υ in (81b).

(81)	a. kámbá girl	l pùt púrú wash cloth:PL	'The girl is washing clothes.'
	b. kámbá girl	ll [↓] púcí -ú [↓] púrú wash -PST cloth:PL	'The girl washed clothes.'
	c. púrú cloth:P	pùt-ì -r L wash-PASS-ASS	'The clothes are being washed.'

However, there is evidence that root-final voiceless obstruents in the passive form are, again, a manifestation of an underlying sequence of two consonants. Table 18 gives an example of the passive form for almost each of the 13 possible root-final consonants, illustrated with the same roots as in Table 15 above, where the root-final obstruents undergo voicing. As seen in Table 18, the passive suffix has an initial consonant after roots that end in a sonorant. The initial consonant of the suffix is everywhere a voiceless obstruent, but its place of articulation varies: it is homorganic with a preceding nasal or lateral, but it is postalveolar /f/ after alveolar /r/, so that /f/ may be taken to be the underlying value of the consonant.

Table	18: Non-H	Past Tense Passive	e Forms of Underived Verbs
	Root	Passive	
/p/	gèp	gèp-ì-r	'cut'
/t/	yèţ	yèt-ì-r	'cut'
/t/	pùt	pùt-ì-r	'wash'
/ʃ/	?ù∫	?ù∫-ì-r	'suck'
/k/	dềk	dềk-ì-r	'tie'
/m/	?àm	?àm-pì-r	'eat'
/n/	mèn	mèn-tì-r	'twist'
/ɲ/	kàp	kàp-∫ì-r	'pick up'
/ŋ/	wàaŋ	wàaŋ-kì-r	'light'
/1/	kàl	kàl-tì-r	'steal
/ r /	?èr	?èr-ſì-r	'break'
/y/	kóoy	kóɔ-ʃí-r	'take'
/w/	wìiw	(unattested)	'lose'

This analysis is supported by the form of the passive suffix after derived stems. Here the passive suffix is $-\int I$, with the voiceless obstruent $/\int/$, as in (82b) and (83b). In (82) the derived verb stem is multiplicative, in (83) centrifugal. The

suffix vowel /1/ which precedes / \int / belongs to the derivational morphemes, since it also occurs in the corresponding active forms, as seen in (82a) and (83a). The centrifugal suffix begins underlyingly with a consonantal segment, which surfaces in (83), while multiplicative stems formed from roots with a short vowel, as in (82), are characterised by lengthening of the root vowel and by Vowel Quality Shift.

(82)	a.	từul child	gíīb-í cut -M	yáa <u>t</u> tree			'The boy is cutting the tree.'
	b.	yáa <u>t</u> tree	gí1b-í -∫í cut -M -P4	-r ASS -ASS			'The tree is being cut.'
(83)	a.	táarák person 'The m	tàaŋ -gí push -Cl an is push	gúr -í 5 stone -S ing a ston	t w SG ou e out.'	òo t	
	b.	gúr -ít stone-S0	tàaŋ - G push -	gí -∫í CF -PASS	wóo out	ŋà by	táarák person

Given that the passive suffix is underlyingly $-\int I$, the voicelessness of root-final obstruents in intervocalic position gets an explanation: the $/\int /$ of the passive suffix totally assimilates to root-final obstruents, and the resulting geminate consonants undergo degemination. The phonological derivation of three of the passive forms in Table 18 is shown in (84).

(84)	pùt-∫ì-r	?àm-∫ì-r	?èr-∫ì-r	Underlying representation
	pùt-tì-r	?àm-pì-r	_	Assimilation
	pùt-ì-r	_	-	Degemination

'The stone is being pushed out by the man.'

The above account of the interaction between root-final consonants and suffixes is not exhaustive, since there are also other alternation sets, for instance in connection with possessive inflection of nouns, as alluded to in section 2.2 above. But in this introductory article I cannot go into all of the complexities of the Kurmuk language. The one-to-many relation between surface obstruents and their underlying represention poses a problem for the analysis of intervocalic obstruents in simplex noun stems, as in (85).

(85)	a. ∫ákál	'pot'
	b. kúutái	· 'pig'
	c. gúdál	'ox'
	d. tàbúr	'dust'

If Intervocalic Voicing is a completely general phonological rule, then the voiceless obstruents [k] in f dk dl and [t] in $k \delta o t dr$ cannot have intervocalic position in the underlying representation of those words; but there is no evidence as to what a different underlying representation would be. Similarly, there is no way of choosing between different underlying alternatives for the intervocalic voiced obstruents [d] in $g \delta d d d$ and [b] in $t d b \delta r$. A viable solution would seem to be to restrict Intervocalic Voicing to obstruents that occur in root-final position, or, more generally, morpheme-final position. By analysing such obstruents as unspecified for the feature [voice] underlyingly, and by restricting the rule of Intervocalic Voicing to obstruents with this specification, that rule would still be completely general. Hence, I shall assume that the underlying representation of the nouns in (85) is identical to their surface representation.

6. Tones.

6.1. Tone inventory. Kurmuk is a tone language with three underlying tones: high (H) / $^{\prime}$, low (L) / $^{\prime}$, and a compound falling tone (\widehat{HL}) / $^{\prime}$. There are five different surface tones. Three of them are level tones: high (H), downstepped high (4 H), and low (L). Two are contour tones, but they are rare, and both of them must be analysed as composed of two level tones: a rise from low to high (\widehat{LH}) and a fall from high to downstepped high (\widehat{H}). At the surface there is no contour tone falling from high to low.

6.2. Surface tones and pitch levels: downdrift and downstep. The pitch of a high tone following a low tone is lower than the pitch of a preceding high tone; that is, Kurmuk has downdrift. In (86), for instance, the high tone of the syllable [k5ok] at the end of the sentence has a lower pitch than the high tones of the initial word [kámbál]; the numbers are explained below.

(86) kámbál Jàap köököök 1 1 3 3 1 - 1 1 1 3 3 2 girl boil meat 'The girl is cooking meat.'

The distance between the pitch of a low tone and that of a following high tone is half the distance between the pitch of a high tone and that of a following low tone. Thus, in a sequence like LHLH, the second H has the same pitch as the first L, as is clear when the utterance is whistled. In (87), for instance, the high tones of [kámbál] at the end of the sentence have the same pitch as the low tone of the sentence-initial syllable [kòo].

(87)	kòəl	kóok	∫áap) -Ì	ŋà	kám	bál
	3	1	1	3	3	1	1
		1	1	1	1	1	1
						1	1
	3	2	2	4	4	3	3
	mea	t	boil	-PASS	by	girl	
	'Th	e mea	t is be	ing coo	ked by	the g	girl.'

Hence, the relative pitch level of each tone of an utterance can be expressed in terms of integers such that the higher the number the lower the pitch, and it can be calculated as done in (86)-(87). First, all high tones are assigned the value 1 and all low tones, the value 3. Then each time that a high tone follows a low tone, 1 is added to that high tone and to all following tones, and the sums indicate the pitch levels. In (86) the downdrift effect occurs once, in (87) twice. In (88), where only the sums are shown, the downdrift effect occurs three times.

wàlá ?ánw-ht ?ín⁄n (88) néet ì 4 4 3 3 5 3 2 4 PROH 2SG suck bones -SG D2:SG 'Don't suck on that bone!'

In addition to downdrift, Kurmuk also has downstep, which is indicated by the symbol $[^1]$. Thus, a high tone may be lower than an immediately preceding high tone, and the pitch distance between these two high tones is identical to the

pitch distance between two high tones separated by one or more low tones. That is, the effect of downstep $[^{\downarrow}]$ on the pitch level value is +1, as illustrated in (89), where the initial high tone of the second word is downstepped after the high-toned first word.

(89)	dúb⁄n	↓?án	ı -úţ	-Ì	ŋà	?áa	mí∫
	11	1	1	3	3	1	1
		1	1	1	1	1	1
						1	1
	1 1	2	2	4	4	3	3
	polenta	eat	-PST	-PASS	by	1SC	3
	'The po	lenta v	vas e	aten by	me.'		

In (90)-(91), where only the sums are shown, downstep occurs twice, in (90) between words, in (91) inside words.

(90)	làakìn	kіі	púrú	⁺tín	bá	[↓] <u>d</u> áaní∫
	3 3	2	2 2	3	3	4 4
	urine(PL)	be.present	cloth:PL	LOC	of	3SG
	'There is	s urine on I	his clothes.'			
(91)	dîınáat	?ínzì	rát -í - [↓] g	íık	míp	-¹∕íkí
	3 2	2 4	3 3	4	4	55
	bird:SG	D3:SG	wing -PL -PI	.:3SG	be.re	d-PRED
	3 2 bird:SG	2 4 D3:SG	3 3 wing -PL -PI	4 .:3SG	4 be.re	55 d-PRED

'That bird's wings are red.'

6.3. Tonal processes: High Spread and Fall Simplification. As demonstrated below, downstep is the manifestation of a floating low tone between two high tones, as in many other African languages. In Kurmuk a floating low tone is normally the result of a general rule of Fall Simplification, which is mostly fed by a general rule of High Spread. To see how these rules work, consider first the noun phrases in (92). They consist of a disyllabic noun and a following demonstrative modifier *?ini* 'this,' which has the tone pattern LL when it occurs in isolation.

(92)	a.	wìnìț	?ìnì	'this rope'
	b.	bùumú	Ŷĩnì	'this hyena'
	c.	ţńnkńl	Ŷinì	'this vulture'
	d.	kábíl	?ìnì	'this sheep'

After the low-toned noun *winit* in (92a) the demonstrative has the same tones, LL, as it has in isolation. But after nouns ending in a high tone in (92b-c), it has the tones HL. What happens can be described as follows: the high tone at the end of the noun spreads to the immediately following low-toned syllable (σ), which thereby gets a compound tone \widehat{HL} , as indicated in (93), using notational devices of Autosegmental Phonology (Goldsmith 1990).

(93) High Spread:

If \widehat{HL} were manifested as such, it would be a contour tone falling from high to low, but Kurmuk has no surface \widehat{HL} tone, so it is manifested as a high tone. That is, \widehat{HL} is simplified to H by delinking the L component from its syllable, thus setting L afloat, as indicated in (94).

(94) Fall Simplification:

The noun in (92d) has a high tone in both of its syllables, exactly like the noun in (92c). However, it does not have the same effect on the following word as the latter; i.e., High Spread does not apply to 2mi here. In order to explain this, it must be assumed that the noun in (92d) does not end in a high tone underlyingly, but that its second syllable has a low tone which is replaced by the high tone of its first syllable via the rules of High Spread and Fall Simplification already established. Independent evidence for this analysis is given in (95). Here the same four nouns are followed by the demonstrative identifier 2mi, which means 'this is', and which forms a non-verbal clause together with the noun.¹⁶

(95)	a.	wìnìț	?íní	'This is a rope'
	b.	bùumú	Ŷíní	'This is a hyena'
	c.	ţńnkńl	?íní	'This is a vulture'
	d.	kábíl	↓?íní	'This is a sheep'







¹⁶I have borrowed the term "demonstrative identifier" from Diessel (1999).

Unlike the demonstrative pronoun, the demonstrative identifier carries a high tone in its initial syllable after all of the four nouns, so its initial tone must be underlyingly high. However, after the noun in (95d), this high tone is downstepped, and that is exactly what should be expected if it is preceded by a floating low tone, as hypothesized above.

High Spread is a completely general phonological rule, i.e., it applies whenever the phonological condition is met.¹⁷ The rule is independent of morphological and syntactic boundaries. Thus, the two syllables involved may constitute a word which is either monomorphemic, as in (96a), or contains a suffix, as in (96b), or they may be part of a word with more than two syllables, as in (97). The forms enclosed in slashes show the underlying tones, while the forms without slashes show the surface tones.

(96)	a. táarák b. tóŋ -ín spear -PL	/táaràk/ /tóŋ-ìn/	'person' 'spears'
(97)	?úuɗú - [↓] wáak ostrich -PL	/?úuɗù-wáak/	'ostriches'
	?ám -út -ì -r eat -PST -PASS-ASS	/?ám-ùt-ì-r/	'It has been eaten.'
	?ám-údੁ - ^r í −r eat -PST-3SG-ASS	/?ám-ùd_í-r/	'He/She has eaten it.'
	?ám -ád -ùud -íkí -r /?ám-àd -ùud -íkí -r/ eat -HAB -PST -3PL -A	SS	'They used to eat it'
	lìm -búz -úud -á -r /lìm-búz -úud -à -r/ dig -BEN -PST -1SG-AS	S	'I dug for him/her.'

¹⁷But there are a few monosyllabic low-toned function words that seem to be immune to High Spread, among others the pronoun i 'you', as seen in (88) above, and sometimes the preposition b_{i}^{λ} 'of', as in (31) above. I have no immediate explanation for these exceptions.

The two syllables involved in High Spread may also belong to two different words, independently of phrase structure. The two words may for instance belong to the same noun phrase, as in (92) above, but they may also belong to different clause constituents, as in (95) above. Other examples of the latter situation are given in (98)-(99). The syntactic boundary crossed is one between object and verb in (98) and one between subject and verb in (99).

(98)	kòokóok /kòokóok meat	∫áab -À -r ∫àab -À -r/ boil -1SG-ASS	'I am cooking the meat.'
(99)	mí -k ∕mí -k woman-PL	dếk [↓] yán dềk yán/ tie tree:PL	'The women are tying the wood.'

6.4. Syllable deletion and leftwards high-tone relinking. Sometimes a syllable is deleted, due to either deletion of a short vowel or vowel coalescence; but in most cases the tone of the deleted syllable is retained. If the tone of the deleted syllable is high, and if the preceding tone is low, the latter may be changed into a rising tone. One example involves the predicative suffix $-\lambda ki$, which is used after adjectival verbs, as in (100a). It is normally shortened to -ki after stems ending in /ŋ/, such as $d\partial z\eta$ 'be big' in (100b).¹⁸ The vowel deletion is sometimes optional, as after the stem *lùuŋ* 'be deep', see the free variation in (101).

(100)	a.	bàar - be.long-	λκί PRED		'It is long.'
	b.	đờoŋ -k be.big-P	á PRED		'It is big.'
(101)	a.	kàal	lùuŋ	-áki	
	b.	kàal hole	lǔuŋ be.deep	-kí -PRED	'The hole is deep.'

¹⁸All attested monosyllabic adjectival verb stems ending in $/\eta$ / have a long vowel. I don't know what would happen after $/\eta$ /-final stems with a short vowel.

What happens in (100b) and (101b) is that the vowel $/\Lambda$ of the suffix is deleted, but that its high tone is retained, as evidenced by the fact that the stem, which is underlyingly low-toned, gets a rising tone. Thus, the high tone of the deleted vowel is transferred leftwards to the preceding syllable, which is thereby manifested with a compound tone, \widehat{LH} , a rise from low to high.

The syllable to which the high tone is transferred may be subjected to High Spread, as in (102). Here the underlyingly low-toned stem $b \hat{\epsilon} \epsilon \eta$ 'be wide' is manifested with a contour pitch which falls from high to downstepped high. How this results from High Spread and Fall Simplification is shown in (103).



The pair of sentences in (104) further illustrates the surface contrast between a rising pitch and a falling pitch.

(104) a.	ríi /ríi hair(PL)	-gík -gìk -PL:3SG	d´əɔŋ -kí d`əɔŋ -ʎkí∕ be.big -PRED	'His hair is long.'
b.	rì1 /rì1 hair(PL)	-gíık -gíık -PL:1SG	d´ວ໋⁺ວ́ŋ -kí d`òɔŋ -ʎkí/ be.big -PRED	'My hair is long.'

Rising and falling tones also arise if the root of the adjectival verb lacks a final consonant, as illustrated with the underlyingly low-toned stem $b\hat{\sigma}$ 'be white' in (105). Here the first vowel of the suffix is not deleted, but coalesces with the root vowel, the result being a long vowel [55].

(105) a.	bðokí /bò be.white	-λkí/ -PRED				'It is white.'
b.	?ົາm /?ົາn PRO:SG	bλ bλ of	kày -áa kày -áa sister-1	bố bồ be.wh	[↓] 5kí -ńkí/ ite -PRED	'My sister's is white.'

6.5. Floating low tones not triggered by High Spread. Given the rules of High Spread and Fall Simplification, we can make three predictions about possible sequences of surface tones in an utterance:

- a. The tone sequence HL is preceded by H, since the L-toned syllable would otherwise be subjected to High Spread.
- b. A downstepped H is preceded by HH, since the downstep represents an L that has been set afloat by Fall Simplification of \widehat{HL} , whose H component comes from a preceding H-toned syllable by High Spread.
- c. A downstepped H is not followed by L, since a downstepped H is an underlying H, which would spread to a following L-toned syllable.

These predictions actually hold most of the time, but not always. Most of the exceptions can be explained as being due to vowel deletion or as reflecting lexically inherent underlying falling tones.

Some of the exceptions involve the deletion of a syllable which would otherwise have undergone High Spread. This situation is illustrated in (106) and (107). The (a)-sentences do not conform to the predictions stated above: In (106a) the sequence HL is not preceded by H, but by L, and in (107a) the downstepped H is not preceded by HH, but by LH. However, the sentences in question have the variants (106b) and (107b), which do conform to the predictions. Here the relevant word, a past tense form of the verb 'drink', has the past tense suffix [úd], whose vowel has been deleted in (106a) and (107a). The underlying tone of this suffix is low, as indicated in the next lines, and its surface high tone is the result of High Spread and Fall Simplification. The underlying low tone set afloat by the vowel deletion is what prevents the high tone of the root vowel from being spread to the vowel of the subject suffix $-\lambda$ in (106a), and it is also what causes the downstep in (107a).

(106)	a.	?àak	máad -d -à -r	
	b.	?àak /?àak milk(PL)	máad -úd - λ -r máad -ùd - λ -r/ drink -PST -1SG -ASS	'I drank the milk.'
(107)	a.	?àak	máad-d-'í-r	
	b.	?àak /?àak milk(PL)	máad -úd - [↓] í -r máad -ùd -í -r/ drink -PST -3SG -ASS	'He/She drank the milk.'

Another example of the same type is given in (108). Here the noun stem $g\acute{a}al\acute{a}t$ 'hand' exhibits variation before the third person singular possessive suffix -*i*. Thus, the second vowel of the stem is optionally elided. But its underlying low tone is retained as a floating tone, and that is why the high tone of the suffix is downstepped not only in (108a), but also in (108b).

(108) a.	gáalá <u>t</u> /gáalà	- ^r ı ț-í	píl píl	-⁺́∧ḱı -∧́kí/	'His hand is paining.	,
	hand	-SG:3SG	be.painfu	I-PRED		
b.	ŋìır /ŋìır knife	gáalt - [↓] í gáal`t -í⁄ hand -SG	:3SG		'the handle of a knife	e'

For another class of exceptions to the predictions stated above, there is no evidence of synchronically operative syllable deletion. This class involves function words and nouns borrowed from Arabic. Thus, some monosyllabic function words that always surface with a high tone never spread this tone, and a following syllable with an underlying high tone is always downstepped. Examples of such words are the distant-future particle [áy] in (109), the first person plural exclusive pronoun [ín] in (110), and the focus particle [dáa] in (111). The (a)-sentences show the lack of High Spread, and the (b)-sentences show the downstepping of a following high tone. Because of these properties, such words must be analysed as having a floating low tone after their high tone, and this low tone will be taken to be linked to the vowel underlyingly. Thus, such words lexically have a falling tone, which is subjected to Fall Simplification. The low tone component of such function words might reflect a historical loss of a second, low-toned syllable.

(109) a.	áy ?àm đúbán /ây ?àm đúbàn FUT2 eat polenta	/	'He/She will eat polenta.'
b.	áy [↓] láal -á -r /ây láal -à -r FUT2 do -1SG-A	pà -díi pà -díi/ SS alone -SG:1SG	'I shall do it myself.'
(110) a.	ín ?àm ɗúb⁄ /în ?àm ɗúb⁄ 1PLEX eat polen	n n/ ta	'We are eating polenta.'
b.	ín [↓] ?ám -ú ∕în ?ám -ù 1PLEX eat -PST	[↓] dúbán dúbàn/ polenta	'We ate polenta.'
(111) a.	ró -dĩ [↓] dáa /ró -dĩ dâa body -SG:3SG FOC	pàl pàl/ be.blunt	'He/She is only lazy.'
b.	?áaní∫ dáa [↓] áy /?áaní∫ dâa ây 1SG FOC FUT2	[↓] ?á <u>d</u> -í ?ádd -ì∕ 2 go -CF	' <i>I</i> will go.'

Some nouns include a syllable that exhibits the same behaviour as the function words dealt with above. They all appear to be loanwords, and at least some of them have been borrowed from Arabic, some of them apparently via Berta. For instance, the nouns in (112) contain the surface sequence LHL, and those in (113) end in the surface sequence LH whose H does not spread to a following word. Therefore, the high-toned syllable of such words must also be analysed as having an underlyingly falling tone, whose low component is set afloat by Fall Simplification. In such words, the floating low tone cannot reflect the loss of a low-toned vowel. The syllable in question is the one that bears the stress in the Arabic source words.

(112)	gàa∫ii <u>d</u> à /gàa∫ìi <u>d</u> à/	/		'porridge type'
	à∫áyì /à∫âyì/			'tea' (cf Berta àffáayì, from Arabic faay)
	?ìŋgìlíizì /?ìŋgìlîizì	ì/		'English' (cf Arabic ?ingiliizi)
(113)	àțìrìmbíil /àțìrìmbîi car	! i 1	?ìmì ?ìmì/ D1:SG	'this car'
	àlpúul /àlpûul bean	?ìnì ?ìnì/ D1:SG		'this bean' (cf Berta <i>àlfûul</i> , from Arabic <i>fuul</i> 'bean')

6.6. Functions of tone. Having established the tonal system, we can now consider the functions of tone. They are both lexical and grammatical, but the functional load of tone seems to be higher in the grammar than in the lexicon. In the following, both functions will be exemplified.

There are two major word classes in Kurmuk: nouns and verbs. Monosyllabic nouns are either high-toned, as in (114a), or low-toned, as in (114b).

(114) a.	tốŋ	'spear'
	mín	'woman'
	máa∫	'fire'
	káak	'snake'
	ýnţ	'scorpion'
b.	kùţ	'rain'
	dyr	'cows'
	tùul	'child'
	dềel	'goat'
	dèeŋ	'cow'

As seen in section 6.3 above, disyllabic nouns fall into four tonal classes, thus exploiting all logically possible combinations of underlying high and low tones (ig-

noring underlyingly falling tones, which seem not to occur in native nouns). Examples are given in (115).

(115) /HH/	tánkál réenóon búurí	'vulture' 'flower' 'twin'
/HL/	táarák ríŋít gúďál	'person' 'meat' 'ox'
/LL/	lègìự mùŋgòn kòoựàr	'tooth' 'name' 'hoe'
/LH/	dìīnáa <u>t</u> kòlgón bùumú	'bird' 'fat' 'hyena'

However, there seem to be relatively few nouns distinguished solely by tone. Two examples of minimal pairs are given in (116)-(117).

(116)	?л̀лт ?л́лт	'thigh' 'kind of magician'
(117)	?àmíț ?ámíț	'food' 'left hands' (underlying /HL/), pl. of ?àam 'left hand'

Verbal roots, virtually all of which are monosyllabic, are also lexically either high-toned, as in (118a), or low-toned, as in (118b-c); but all roots with a short vowel are lexically low-toned, as in (118c). The roots given in (118) are transitive.

(118) a.	máat	'drink'
	táaŋ	'push'
	púur	'hoe'
	wέε∫	'sweep'

b.	pìuț	'sow'
	bèer	'twist'
	kàal	'push'
	ɗàak	'finish'
c.	?àm	'eat'
	kàl	'steal'
	lèk	'break'
	nàn	'bite'

Again, verbal roots distinguished exclusively by tone seem to be rare. One example is given in (119).

(119) páat	'twist' (tr. verb)
pàat	'be wide' (adjectival verb)

More minimal pairs of lexical items can be found if taken from different word classes, as in (120)-(122).

(120)	rée	'two' (numeral)
	rèe	'thirst' (noun)
(121)	mín mìn	'woman' (noun) 'from' (preposition)
(122)	wàlà wàlá	'or' (conjunction)'do not' (particle expressing prohibition)

The functional load of tone is considerably heavier in the grammar than in the lexicon. Thus, in many parts of the morphology, tone is what systematically distinguishes one category from another in some morphological contexts. This is illustrated by the minimal pairs in (123)-(129). In each case both the surface tones and the underlying tones (in slashes) are shown.

Examples (123)-(124) illustrate the tonal difference between demonstrative modifiers and demonstrative identifiers.

(123)	țáarák /țáaràk person	?ìmì ?ìmì/ D1:SG	'this person'
	táarák /táaràk person	⁴ ĩíní ĩmì/ ID1:SG	'This is a human being.'
(124)	lć∫ /lć∫ teeth	Yikì ?ìkì/ D1:PL	'these teeth'
	lấ∫ /lấ∫ teeth	?ίkí ?íkì/ ID1:PL	'These are teeth.'

Example (125) shows the tonal difference between the first person singular pronoun \dot{a} and the near future particle \dot{a} .

(125)	à /à 1SG	?àm ?àm eat	dúbλn dúbλn/ polenta	'I am eating polenta.'
	á /á FUT1	?ám ?àm eat	[↓] ɗúb∕n ɗúbλn/ polenta	'He/She is going to eat polenta.'

Examples (126)-(127) illustrate the tonal differences between different possessive suffixes: first person singular versus third person singular in (126), and second person singular versus second person plural in (127).

(126) kìr -ਨ -gínk /kìr -ਨ -gìnk	pìl -ákí pìl -ákí/	'My legs are painful.'
leg -PL -PL:1SG	be.painful-PRED	
kír -á -⁴gíık /kír -à -gíık	píl -⁴ákí pìl -ákí/	'His legs are painful.'
leg -PL -PL:3SG	be.painful-PRED	

(127) kír -á - [↓] gúuk /kír -à -gúuk leg -PL -PL:2SG	píl - [↓] ÁKí pìl -ÁKí/ be.painful-PRED	'Your (sg.) legs are painful.'
kír -Á -gùuk /kír-À -gùuk leg -PL-PL:2PL	pìl -ʎkí pìl -ʎkí/ be.painful-PRED	'Your (pl.) legs are painful.'

Example (128) shows the tonal difference between the continuous and the habitual aspect suffixes in verb forms with a short root vowel.

(128) táa	aràk i	kàl -á	dínt	'The man is trying to steal goats.'
/tá	aràk i	kàl -á	dínt∕	
per	son i	steal-CONT	goat:PL	
táa	aràk	⁺kál-á	[↓] ɗínt	'The man steals goats.'
/tá	aràk I	kál -à	dínt/	
per	son	steal-HAB	goat:PL	

Finally, example (129) illustrates the tonal difference between the assertive suffix after a non-derived intransitive verb stem and the second person singular subject suffix in the imperative form with the same stem.

(129) bùḋ -ì	'He/She starts running'
/bùġ-ì/	
run -ASS	
	(-
bùd -i	'Run!'
/bùġ-í/	
run -2SG	

6.7. Grammatically determined tone alternation. When a root combines with a suffix, its underlying tone often deviates from its lexical underlying tone. Moreover, the underlying tone of many suffixes is dependent on the tonal class of the root. Thus, Kurmuk is replete with grammatically determined tone alternation, which is distinct from the tonal variation that results from phonologically determined tonal processes such as High Spread. A few examples from the morphol-

ogy of verbs can illustrate this fact. As seen in (130a), the lexical tone of the verbal root $t\dot{a}a\eta$ 'push' is underlyingly high; but before the high-toned third person singular subject suffix $-\dot{i}$, its underlying tone is low, as seen in (130b). Conversely, the tone of the verbal root $r\dot{v}dt$ 'transplant' is lexically low, as shown by the form in (131a); but before the same underlyingly high-toned third person singular subject suffix its underlying tone is high, as seen in (131b).

(130) a.	từul /từul child	táan gúr -ít táan gúr -ít/ push stone-SG		'The child starts pushing the stone.'
b.	ŋòo /ŋòo what	tàaŋ -í ?án tàaŋ -í ?àn push -3SG here	ÌÌ ÌI/ e	'What does he/she start pushing here?'
(131) a.	từul /từul child	rὺυ <u>t</u> pá∫ rὺυ <u>t</u> pá∫/ transplant sorgh	um(PL)	'The child is transplanting sorghum.'
b.	ŋòo /ŋòo what	rúud -í rúud -í transplant -3SG	?ánì ?ànì∕ here	'What is he/she transplanting here?'

Other examples of underlying tone alternation in roots can be seen, for instance, in (126) and (128) above.

One of the suffixes that exhibit tone alternation is the second person singular subject suffix -i. As illustrated in (132) with the same verbal roots as in (130)-(131), it has an underlying low tone in (132a) after a lexically high-toned root, but an underlying high tone in (132b) after a lexically low-toned root, which here carries an underlying high tone.

(132) a.	ŋòo /ŋòo what	táan -í táan -ì push -2SG		ànì ànì/ ere	'What do you start pushing here?'
b.	ŋòo /ŋòo what	rúud rúud transplar	-1 -1 nt -2SG	?ánì ?ànì∕ here	'What are you transplanting here?'

7. A Nilotic Outlook.

Kurmuk and other Northern Burun languages exhibit a more extensive use of suffixes than most other Western Nilotic languages. Thus, although roots are typically monosyllabic in Kurmuk as elsewhere in Western Nilotic, words tend to be longer in Kurmuk than in languages of the Lwo branch of Western Nilotic and certainly much longer than in Dinka and Nuer, which tend towards monosyllabicity. In this respect, then, the Northern Burun languages are reminiscent of the Southern and Eastern Nilotic languages. Nevertheless, the types of grammatically determined root-internal alternations which are found in the other branches of Western Nilotic, and which are assumed to reflect former suffixes, are also found in the Northern Burun languages, namely alternations in vowel length, vowel quality, final consonant, and tone. Thus, although the Northern Burun languages are certainly morphologically conservative in many respects, they seem not to have retained all of the specific suffix features that could explain the alternations in the other Western Nilotic languages.

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