

NOUN CLASSES AND PHONOLOGY IN KŌNNI

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The five noun classes of Kōnni are defined by suffixal morphology. In this article, these classes are exemplified and described. Three phonological processes (g-deletion, n-deletion, and tonal polarity) which are limited to specific noun classes or morphemes are also described. The synchronic arbitrariness of assigning these processes to specific noun classes is suggested to be the result of regular historical processes. Contrary to what most writers in Optimality Theory have written, these processes show the necessity of language-specific constraints.

Les cinq classes nominales de kōnni sont déterminées par la morphologie suffixale. Dans cet article, ces classes sont exemplifiées et décrites. Trois processus phonologiques (l'effacement de g, l'effacement de n, et la polarité tonale), limités aux classes et aux morphèmes spécifiques, sont également décrits. Bien que ces processus soient arbitrairement attribués aux classes nominales spécifiques, il est suggéré que c'est le résultat des développements historiques normaux. Contraire aux ouvrages écrits par la plupart des auteurs de la Théorie de l'Optimalité, ces processus démontrent la nécessité des contraintes particulières à une langue.

0. INTRODUCTION

This article has two closely connected goals.¹ The first is to describe the noun class system of Kōnni and the morphology that delineates the noun class of a noun. The second goal, which is dependent on the first, is to describe some phonological patterns which are dependent on the noun class. In recent years, interfaces between various subdomains of linguistics have assumed a prominent place in the literature, e.g., Inkelas and Zec (1990) for phonology and syntax. In this article, I contribute to the literature which shows that some of the phonology is determined by morphology.

In Kōnni, a Gur language of northern Ghana, several phonological processes are limited to one morpheme or noun class. These include the spread of +ATR from adjectives into noun stems, deletion of consonants only in certain noun classes, and tonal polarity in only one nominal suffix. The latter two will be examined in this article. At least some of these patterns may be traced to regular diachronic changes which resulted in irregular synchronic phonology.

Discussion of noun classes in the Gur family may be found in Manessy (1979), Nicole (1998), and Naden (1989), while noun classes of specific Gur languages are discussed in Carlson (1994), Kröger (1992), Bodomo (1997), Nicole (1998), Neukom (1995), Ourso (1989), Garber (1987), Beacham (1968), Peterson (1971), and Naden (1988). See Welmers (1973) for a discussion of noun classes in a larger African context. Buli is the nearest relative of Kōnni (Naden 1988, 1989), and a reconstruction of the noun class system of Proto-Buli-Kōnni is found in Cahill (1997). Each of the Kōnni classes will be discussed in more detail below, with representative examples. A fuller set of nouns grouped by noun class is found in Cahill (1999).

1. NOUN CLASSES IN KŌNNI

A minimal noun in Kōnni contains a noun stem and a singular/plural suffix (with the exception of nouns of class 5, which have a zero suffix; see (3)). Adjectival

¹Much of this material is extracted from Cahill (1999); the data was gathered during several years while resident in the village of Yikapongo. I thank many Kōnni speakers, including Mr. Ben Saibu, Abdulai Sikpare, and especially Salifu James Amadu for sharing their mother tongue with me and bearing with my frequent obtuseness.

morphemes, which are suffixed to the noun stem (§1.2) may occur between the noun stem and the noun class suffix, and a definite suffix may occur as the last element in the word. The structure of the non-compound noun in Kɔnni is, with optional elements in parentheses:

- (1) Noun → Noun stem (Adj1) (Adj2) (Adj3) Suffix (Article)

The above formulation is inadequate in one respect. The behavior of the singular suffix differs from the plural suffix in that the plural definite article is *added* to the plural suffix, but the singular definite article *replaces* [-ŋ]:²

- | | | | | |
|-----|--------------|---------------|-------------|-----------------|
| (2) | díí-ŋ | díí-rí | dí-è | dí-é-!hé |
| | forehead-SG | forehead-the | forehead-PL | forehead-PL-the |
| | Ns Sfx | Ns Art | Ns Sfx | Ns Sfx Art |
| | forehead | the forehead | foreheads | the foreheads |

The suffix -ŋ may be regarded as an indefinite suffix, in contrast to the definite suffixes. It is the form that appears on most nouns in citation form.

1.1 THE NOUN CLASSES

The noun class system of Kɔnni is manifested on the definite article and plural suffixes, as illustrated in (3) below. The numbering of the classes is arbitrary; no attempt has been made to connect these with the noun class system of Niger-Congo or other Gur languages. The tendency in most work on African languages, especially Bantu, is to label each singular and plural suffix as belonging to a separate “noun class”, and label the combination of each singular and plural noun class as a “gender”. Here I have followed the convention of placing each noun into a noun class, rather than each suffix into a noun class. For the overwhelming majority of nouns, one can predict the singular suffix on the basis of the plural and vice versa. Other writings on Gur languages which follow this pattern of labeling noun classes include Olawsky (1998), Naden (1988, 1989), and Bodomo (1997).

My current database includes 989 nouns, of which I can identify the noun class of 728. (The class remains unidentified for those nouns for which I do not have a definite or plural form.) The approximate percentage that each noun class comprises of this total is indicated in the table in (3). Vowels in the suffixes given with capital letters indicate that that vowel harmonizes in ATR value with the root, so /í/, for example, is realized as either [i] or [ɪ].³

²What I have labeled as the singular DEFINITE suffix here seems to correspond to the noun class suffix itself in other Gur languages. Proto-Buli-Kɔnni has undergone a restructuring of the noun class system, and Kɔnni uniquely has merged almost all singular indefinite forms into the suffix -ŋ (Cahill 1997).

³Kɔnni has a nine-vowel system typical of many Gur languages, with the vowels dividing into two sets based on the ATR feature:

Short vowel phonemes				Long vowel phonemes			
+ATR		-ATR		+ATR		-ATR	
i	u	ɪ	ʊ	ii	uu	ɪɪ	ʊʊ
e	o	ɛ	ɔ	ie	uo	ia	ua
a				aa			

Note that long mid vowels generally are realized as diphthongs. The ATR value of suffixes in Kɔnni agrees with the noun stem, and so suffixes may be regarded as unspecified for ATR value. Thus, a suffix listed as /-kU/ is realized as either [-kʊ] or [-ku], /-rɪ/ is realized as either [-rɪ] or [-ri], and /-A/ is realized as either [-a] or [-e]. For details on Kɔnni vowel harmony, see Cahill (1999).

(3)	Nouns	Singular	Sg. def.	Plural	Pl. + def.	% of nouns
	Class 1 bee	/-ŋ/ siébíŋ	/-rí/ siébírí	/-A/ siébìè	/-A-hÁ/ siébíé!hé	26
	Class 2 courtyard	/-ŋ/ gbàáŋ	/-kÚ/ gbààkú	/-tí/ gbààtí	/tí-tí/ gbààtítí	12
	Class 3 man	/-ŋ/ dèmbíŋ	/-kÁ/ dèmbiké	/-sÍ/ dèmbìsì	/-sÍ-sÍ / dèmbìsísí	31
	Class 4 meat	/-ŋ/ nǒŋ	/-bÚ/ nǒmbú	/-tí/ nǒntí	/-tí-tí/ nǒtítí	7
	Class 5 child	/-ɿ/ bùá	/-wÁ/ bùàwá	irreg. bàllí	irreg. bàllílí	13
	Mixed (sing. definite from one class, pl. from a different one) goat	bíŋ	bìkú	bìè	bìèhé	11

As noted above, the noun classes are differentiated by means of the definite or plural suffixes. The indefinite singular suffix -ŋ is common to all classes except noun class 5. Noun class 4 consists of mass nouns, and class 5 consists of humans, but apart from these, assignment of a noun to the other three classes appears to be arbitrary, with no semantic basis for assigning a particular noun to one noun class versus another.

There is a strong tendency for the plural definite suffix to be a reduplicated form of the plural indefinite. This is seen particularly in classes 2, 3, and 4, where the plural definite is an exact reduplicate of the plural indefinite (-tí/-títí and -sÍ/-sísí). Even for class 1, the [-hÁ] plural definite suffix is quite close to being a reduplicant of [-A]. In the class 5 example given in (3), the reduplication pattern holds in the particular sample word given (-lí /-lílí), but most of the class 5 nouns have /-ba/ for a plural definite suffix (see (8)). So in most forms, the definite plural may be looked on as RED, a reduplicated form of the plural suffix. Except for the definite plurals, most nouns have a single suffix which combines the markings of number and definiteness: singular/ indefinite, singular/definite, and plural/indefinite.

I now present the characteristics of the various noun classes.

Noun class 1 is unique in Kɔnni in having a plural suffix which consists of only a vowel.

(4) Noun class 1

	Singular	Sg. art.	Plural	Pl. + Pl. art.
(a) bee	/-ŋ/ siébíŋ	/-rí/ siébírí	/-A/ siébìè	/-A-hÁ/ siébíé!hé
breast	bìsíŋ	bìsírí	bìsá	bìsáhá
chin	bítí!éŋ	bítíé!rí	bítíè	bítíé!hé
forehead	díŋ	díírí	díè	díé!hé
gr. stone	níŋ	níírí	níà	níá!há
house	tíŋ	tígírí	tígè	tí!géhé
log	dàmpàlí	dàmpàllí	dàmpàlá	dàmpàláhá
problem	wíŋ	wíírí	wíà	wíá!há
shade	jágíŋ	jágírí	jágâ	jágá!há

	stump	dààgbúgín	dààgbúgírí	dààgbúgê	dààgbúgê'hé
(b)	knee	dǔŋ	dùnní	dùné	dùnéhé
	stone	tǎŋ	tànní	tàná	tànáhá
(c)	nail/arrow	yí'íŋ	yí'írí	yíímà	yí'ímáhá
	seed	bíŋ	bínní	bîè	bíé'hé
(d)	chest	ɲóúŋ	ɲóúrí	ɲúra	ɲó'ráhá
	day	dàáŋ	dààrí	dàrá	dàráhá
	heart	sìkpááŋ	sìkpáárí	sìkpàrà	sìkpá'ráhá
	hoe	kùúŋ	kùùrí	kùrà	kùráhá
	name	sàáŋ	sààrí	sàrá	sàráhá

As in most nominal suffixes, the suffixes of noun class 1 are H-toned, with the notable exception of the plural morpheme /-A/, which is either H- or L-toned, having the opposite tone of the preceding tone. This tonal polarity is discussed in §2.2.

Several alternations are apparent above. The singular article, given as /-rǐ/, is realized as [-rǐ], [-lí], or [-nǐ], the first occurring between vowels, and the latter two by assimilation to a final sonorant stem consonant. If the noun stem ends with a non-sonorant consonant, an epenthetic vowel [i] is inserted before the suffix. Also, although every singular indefinite form ends with -ŋ, this masks the fact that some noun STEMS end with a nasal, which is evident on the definite and plural forms in (4b). There are a few words, as in (4c), which have an unexpected nasal in the plural forms which is not present in the singular definite (e.g., yí'írí 'the nail', yíímà 'nails') or have a nasal in the singular which seems to be missing from the plural form (e.g., bínní 'the seed', bîè 'seeds'). At least some of these are due to historical developments which produced synchronically different roots for singular and plural forms (Cahill 1997). Suppletive forms occur in Kɔnni with even more drastic differences, e.g., náá'gíŋ/níigè 'cow/s', in which the stem vowels, the ATR, and the noun class is different in the singular and plural. Also, forms with [aa] or [uu] as the final vowel in the noun stem, as in (d), apparently shorten that vowel in the plural, and insert [r] preceding the expected suffix [-a] (but see analysis in Cahill 1999).

Examples of noun class 2 nouns are presented in (5).

(5) Noun class 2

	Singular	Sg. art.	Plural	Pl. + Pl. art.
	/-ŋ/	/-kÚ/	/-tǐ/	/tǐ-tǐ/
baboon	fááŋ	fáákú	fáátí	fáátítí
farm	kúáŋ	kúákú	kúátí	kúátítí
hawk	kpíí'líŋ	kpíí'líkú	kpíí'lítí	kpíí'lítítí
inside	sǔŋ	sùkú	sùtí	sùtítí
path	síéŋ	síékú	síétí	síétítí
shoulder	bìŋkpíáŋ	bìŋkpiàkú	bìŋkpiàtí	bìŋkpiàtítí
skin, book	gbáníŋ	gbáŋkú	gbántí	gbántítí
vulture	zùúŋ	zùùkú	zùùtí	zùùtítí
wood, stick	dàáŋ	dààkú	dààtí	dààtítí
worm	gbáráŋ	gbárákú	gbárátí	gbárátítí

Nouns in this class are quite regular, with largely transparent morphology and very few phonological alternations. An exception to this is *vóríí* ~ *vóttí* 'holes,' with optional vowel deletion and assimilation of stem-final /r/ to the following /t/. Stem-final nasals are uncommon in this class, with /gbán-/ 'skin' being the only example in my data. The plural morphemes *-tí/-tí-tí* occur in noun class 4 as well.

Examples of noun class 3 nouns are presented in (6).

(6) Noun class 3

	Singular	Sg. art.	Plural	Pl. + Pl. art.
	/-í/	/-kÁ/	/-sÍ/	/-sÍ-sÍ /
axe	lí'án	líá'ká	líásí	líá'sísí
back	kù'án	kùà'ká	kùàsí	kùà'sísí
chicken	kpí'án	kpíá'ká	kpíásí	kpíásísí
comb	zúúchásín	zúúchásíká	zúúchásá	zúúchásísí
cookpot	kúrúbâ	kúrúbá'ká	kúrúbá'sí	kúrúbá'sísí
dog	gbà'án	gbàà'ká	gbààsí	gbààsísí
fly	nánjúsín	nánjúká	nánjúsí	nánjúsísí
hat	síbúbú'ín	síbúbúké	síbúbúsí	síbúbúsísí
headpan	tá'sín	tásí'ká	tásísí	tásí'sísí
knife	jìbín	jìbíká	jìbísí	jìbísísí
lamp	pópólí	pópólíké	pópólsí	pópólsísí
man	dèmbín	dèmbíké	dèmbìsí	dèmbìsísí
mussel	kálángbì'án	kálángbíá'ká	kálángbíá'sí	kálángbíá'sísí
person	vúón	vúóké	vúósí	vúósísí
tree (sp.)	sě'ín	sèké	sènsí	sènsísí

Though most of the nouns here follow the usual pattern of having -ín in citation form, a few do not (e.g., 'cookpot, lamp'). These seem to be mostly, perhaps all, borrowed words, e.g., *pópólí* 'lamp' is from Buli *polipoli*, *dúníá* 'world' is from Hausa *duniya*, *bólí* 'ball' is from English ball. Noun class 3 seems to be the default class in which to place borrowed words.

One other slight aberration is that in several cases the plural suffix *-sÍ* occurs with a L instead of the usual H tone. These are all nouns in which there is a downstep in the citation form, and this tonal pattern is analyzed in Cahill (1999) as a historical relic resulting in lexical *-sÍ* rather than *-sÍ* for these several words.

Examples of noun class 4 nouns are presented in (7).

(7) Noun class 4

	Singular	Sg. art.	Plural	Pl. + Pl. art.
	/-í/	/-bÚ/	/-tí/	/-tí-tí/
ash	tápéé'í'ín	tápéé'í'úbú	tápéé'í'tí	
funeral	kũ'ín	kùmbú	kùntí	kùntítí
hunger	kú'ín	kúmbkú	kúntí	kúntítí
meat	nǎ'ín	nǎmbú	nǎntí	nǎntítí
medicine	tì'ín	tìbú	tìtí	tìtítí
oil	kpá'án	kpáábú	kpáátí	kpáátítí

peanut	sìṅkpááṅ	sìṅkpáábú	sìṅkpáátí	sìṅkpáátítí
porridge	sàáṅ	sààbú	sààtí	sààtítí
sleep	gbí'íṅ	gbí'íbú	gbí'tí	gbí'títí
thing	jàáṅ	jààbú	jìntí	jìntítí
water	ṗááṅ	ṗáábú	ṗáátí	ṗáátítí
wind	bùlògsíṅ	bùlògsíbú		

The plural morphemes **-tí/-tí-tí** of noun class 4 are shared with noun class 2 as well. Noun class 4 is one of the two noun classes in Kɔnni which has a semantic basis. Nouns in this class are mass or possibly abstract nouns, and therefore sometimes have no commonly-used plural form. Kröger (1992) also notes that in Buli, his “-**bu** class”, which corresponds to noun class 4 here (Cahill 1997), refers to liquids, masses and abstracts, and often has no plural form. Two issues arise from the claim of semantic unity for this class: first, how can a mass noun, by definition uncountable, have a plural form, and second, how can words like ‘peanut, funeral, thing’, which are definitely countable or concrete, be considered mass nouns or abstract?

Mass nouns may have plural forms when they refer to a *portion* or share of the noun (“how many coffees did you order?”) or different *types* of the noun (“the wines there are fantastic”). These plural forms would be severely restricted as to the contexts in which they could be used, and such is in fact the case for words like ‘meat, porridge, oil, medicine’, etc.

As for the ‘peanut’, ‘funeral’, and ‘thing’ not being mass or abstract nouns, I suggest this may be a function of worldview as much as any inherent qualities of the nouns, and also that the semantic matches of the words may not be identical in English and Kɔnni. ‘Peanut’ is not a mass noun in English, but in Kɔnni it functions in a way similar to ‘corn’ in English. One does not count individual peanuts in Kɔnni, just as one does not count individual grains of corn in English. Thus, for sentences glossed as ‘the peanuts are in front of you’, ‘I’m eating/planting/shelling peanuts’, the morphologically singular form is used.⁴ The word glossed ‘funeral’ also means ‘death, dying’ in Kɔnni. It is a broader and more abstract idea than conveyed by the simple English gloss ‘funeral’, but ‘funeral’ is the single word which comes closest to the most common situation in which *kɔ* is used. The word ‘thing’ is used in Kɔnni for physical items, actions, events, situations, even people. ‘Funeral’ and ‘thing’ are in this noun class in Buli as well, and seem to be more abstract in Ghanaian minds than in Western ones.⁵

Examples of noun class 5 nouns are presented in (8).

⁴When one wants to refer to a single peanut, one may say ‘single peanut’ or ‘one peanut’.

⁵This is probably widespread in West Africa and perhaps further. In Adioukrou (Kwa, Côte d’Ivoire), the word for ‘thing’ behaves morphologically as a mass noun (Ralph Hill pers. comm.). In Gichode (Kwa, Ghana), ‘a bad thing’, morphologically singular, can refer to either a singular or plural object, or an action (Linda Neeley pers. comm.). In Kɔnni and these languages, ‘thing’ is quite broad in application, and is used for physical items, actions, events, situations, even people. The ranges of meaning of a word like ‘something’ in English catches some of this flavor.

(8) Noun class 5

		Singular	Sg. art.	Plural	Pl. + Pl. art.
		/-ɿ/	/-wÁ/	irreg.	irreg.
child		bùá	bùàwá	bàllí	bàllíí
cook		dìdìgìrú	dìdìgìrùwó	dìdìgìrín	
daughter		líà	líá'wá	lí'án	
father	(a)	chùá	chùàwá	chùá'líŋ	chùàlí' bá
	(b)	chǒŋ	chòŋwá	chùá'líŋ	chùàlí' bá
friend		zùá	zùàwá	zùá'líŋ	zùàlí' bá
husband		chòró	chòrùwá	chòró'líŋ ~ chòl'í'líŋ	chòllí' bá
mother	(a)	nàá	nààwá	níí'líŋ	nìlì' bé
	(b)	nǔŋ	núŋ'wó	níí'líŋ	nìlì' bé
sister		táà	táá'wá	táá'líŋ	táálí' bá
older sibling (same sex)		míì	míí'wá	míí'líŋ	míllí' bá
woman/wife		hògú	hògùwá ~ hòwwá	hùán	hùàbá

Noun class 5 is a semantically-based class, containing only human nouns. Not all humans, however, are contained in noun class 5, as shown by **dèmbíŋ** 'man' in noun class 3. Noun class 5 is the only one which does not have -ŋ as a singular indefinite suffix. It instead adds no overt suffix to the noun stem. This noun class is also the only one in which most plurals end in -ŋ, either by itself or as a part of the suffix -líŋ (contrasting with most nouns which have -ŋ as a singular suffix). The singular definite suffixes are regular, with -wÁ on all forms. However, the plural forms are not constant. Most have -líŋ as the plural suffix, but forms that have another suffix are not uncommon, e.g., **bàl-lí** 'children', **lí'á-ŋ** 'daughters', **hùá-ŋ** 'women' above, the latter two having -ŋ as the suffix. For the plural definite, almost all forms have a -bÁ suffix. The only ones which to my knowledge do not are 'child' and compounds derived from it.

The -bÁ plural definite suffix is so strongly associated with humans that it is often added as the plural definite suffix even when, on the grounds of the basic noun class of the noun or adjective stem, a different suffix would be expected, as in **hògù-kpíí' má-bá** 'the large women,' where the plural adjective **kpíí'mà** 'large' generally takes the definite suffix -há (cf. **jàà-kpíí' má-há** 'the big things', and discussion in §1.2).

Nouns of noun class 5 makes up 13 percent of the total nouns in my database in (3). This is probably an overrepresentation, since approximately two-thirds of the nouns I have in this class have the -rU agentive suffix, which I actively elicited.

This noun class contains the only forms I am aware of which have a contour tone on a non-final syllable, found always in the plural forms such as 'friends, fathers'. They are always followed by a downstepped H in the next syllable.

This class is also unique in containing two members, 'father' and 'mother', which have different forms for a word according to its possessor. First-person and second-person singular possessors take one form, and second-person plural and third-person possessors take another form, as below. The forms 'father' and 'mother' are also

distinguished by being the only nouns in which the first- and second-person possessive pronouns are H-toned.

(9) Possessed forms of 'father' and 'mother'

1s	ń 'náa	my mother	ń 'chúá	my father
1p	tí 'náa	our mother	tí 'chúá	our father
2s	fí 'náa	your mother	fí 'chúá	your father
2p	nì nǔŋ	your (pl.) mother	nì chǒŋ	your (pl.) father
3s	ù nûŋ	his/her mother	ù chôŋ	his/her father
3p	bà nûŋ	their mother	bà chôŋ	their father
3s nh	kà nûŋ	its mother	kà chôŋ	its father
3p nh	à nûŋ	their mother	à chôŋ	their father

Though most nouns fit into the classes devised above, about 11 percent of nouns have singulars from one class and plurals from another, as exemplified in (10). Note that the singulars are assigned to a class based on the singular definite forms.

(10) Mixed class nouns

	Classes (sg., pl.)	Singular	Sg. art.	Plural	Pl. + Pl. art.
goat	2, 1	bíŋ	bùkú	bié	bìèhé
guinea fowl	2, 1	kpá'áŋ	kpáá'kú	kpíínè	kpíí'néhé
room	2, 1	jùòŋ	jùòkú	jùné	jùnéhé
block	2, 1	wáríŋ	wáríkú	wàrà	wá'ráhá
cow	4, 1	náá'gíŋ	náágí' bú	níigè	níí'géhé
horse	4, 1	dùúŋ	dùùmbú	dùùné	dùùné' hé
rope	4, 1	gú'úŋ	gúúm' bú	gúúnê	gúúné' hé
blindness	2, 3	yî	yí'kú	yíísí	yíísísí
chair	2, 3	chíàŋ	chíá'kú	chíásî	chíá'sísí
antelope	3, 1	yìsín	yìsíké	yìsé	yìséhé
tree (sp.)	3, 1	hààríŋ	hààríká	hààrá	hààráhá
rubbish heap	1, 3	tàngúúŋ	tàngúúrí	tàngúúsí	–
vulture	3, 2	zùúŋ	zùùké	zùùtí	zùùtítí

Though several combinations of noun classes are attested, almost half of the "mixed class" nouns in my data have plurals in noun class 1.

Some nouns may have more than one acceptable form of the definite article, and so may be classed in more than one noun class. For example, 'the vulture' may be either **zùùké** as in (10), or **zùùkú**. Whether this is a true variation or represents confusion on the part of Mr. Amadu, who is not as intimately acquainted with wildlife as some, remains to be seen.

Also, for some fruit-bearing trees in particular, one singular indefinite form is used for both the tree and its fruit or product, but a different plural form may sometimes be used for the tree and the fruit as shown in (11).

- | | | | |
|------|----------------------|------------------------|--------------------------------------|
| (11) | ‘papaya tree’ | | ‘dawadawa tree’ |
| | kàmbùntáá!mìŋ | papaya (tree or fruit) | dùúŋ dawadawa (tree or fruit) |
| | kàmbùntáán!sí | papaya trees | dùùsí dawadawa trees |
| | kambùntáámà | papaya fruits | dùùtí dawadawa fruits |

The plural suffix for most species of trees (26 out of 34 I have data for) is the *-si* noun class 3 plural suffix, as is the suffix for the general word for ‘trees’ **tíísí**. When there is a distinction between the fruits of a tree and the trees themselves, the trees themselves always take the *-si* plural suffix.

1.2 NOUN-ADJECTIVE COMPLEXES

Welmers (1973:250) writes that “in almost all Niger-Congo languages which have a class of adjectives, the class is rather small, and many concepts expressed by adjectives in European languages are expressed by other kinds of constructions using nouns or verbs or both”. Carlson (1994) gives the exhaustive list of adjectives in Supyire as “small, big, good, first, new, hot, white, same, red, all, last, beautiful”. Kɔnni, in common with these languages, has very few underived adjectives, about a dozen. These basic adjectives include big, small, white, black, red, short, long, new, old, bad, wide, thin, while concepts of good, heavy, sweet, bitter, hot, cold, rotten, tired, etc. are expressed by verbs, e.g., **ù gbàlìgá mìn** ‘s/he is “tireding”’, i.e., getting tired. Adjectives derived from these and other verbs, however, are fairly common.

Adjectives are discussed here as part of the noun class system for two reasons. They are always bound to nouns; try to elicit ‘white’ and you will get the response ‘white *thing*’. (This is in contrast to numbers and other quantifiers, which can stand alone.) Qualitative adjectives are bound morphemes in many other Gur languages, and this seems to be the usual pattern for this language family. See Kröger (1992) for Buli, Carlson (1994) for Supyire, Bodomo (1997) for Dagaare, Nicole (1998) for Nawdm, and Naden (1988) for Vagla, Mampruli, and Gur languages in general. Secondly, the suffixes attached to adjectives are the same as the set of noun class suffixes discussed above. The adjective suffix may or may not be the same as the root noun would take by itself, as shown by examples in (12). The suffix is determined by the last adjective or noun stem present.

- | | | | | | |
|------|-----|----------------|-----------|---------------------|---------------|
| (12) | (a) | kpíá-sí | fowls | kpíá-yéél-à | white fowls |
| | | fowl-PL | | fowl-white-PL | |
| | (b) | dùùm-bú | the horse | dùùŋ-ŋmìn-ká | the red horse |
| | | horse-the | | horse-red-the | |
| | (c) | hòw-wá | the woman | hògù-kpíí-ká | the big woman |
| | | woman-the | | woman-big-the | |

It is clear that adjectives in Kɔnni have quite different behavior than adjectives in Bantu and other Niger-Congo languages, in which adjectives are not only separate words, but exhibit concord with the noun class of the noun they modify.

Additional evidence that the suffix of a form does not depend on the noun, but on the adjective is given in the set of data below. Here, the noun is constant, but the suffix varies according to the adjective present.

(13)	X thing	the X thing	X things		class (sg/pl)
	jà-kùúŋ	jà-kùù-rí	jìŋ-kù-rá	old	Class 1
	jè-góbíŋ	jè-góbí-rí	jìŋ-gób-è	short	Class 1
	jà-wóŋ	jà-wók-kú	jìŋ-wóŋí-tí	long	Class 2
	jà-biáŋ	jà-bià-kú	jìŋ-bià-tí	bad	Class 2
	jè-bíŋ	jè-bì-ké	jìŋ-bì-sí	small	Class 3
	jà-kpí'íŋ	jà-kpíí-'ká	jìŋ-kpíím-à	big	Class 3/1
	jà-yèèlíŋ	jà-yèèlí-ká	jìŋ-yèèl-á	white	Class 3/1
	jà-sóbí'íŋ	jà-sóbíí-'ká	jìŋ-sóbíí-à	black	Class 3/1
	jà-ŋmùŋíŋ	jà-ŋmùŋ-ká	jìŋ-ŋmùŋ-á	red	Class 3/1
	jà-háá'íŋ	jà-háá'íí-ká	jìŋ-hááí-à	new	Class 3/1

More adjectives have singular suffixes from class 3 and plurals from class 1 than other patterns, but this is by no means universal.

Above with 'thing', the suppletive plural noun stem **jìN-** 'things' occurs with plural adjective forms, not the singular form **jà-** 'thing'. This situation is quite rare in Kɔnni. Few nouns have suppletive plural forms, but with most nouns which do have suppletive plural forms, the singular stem is used even when a plural form of the adjective occurs, as in (14a) and (14b).

- (14) (a) **náá'gíŋ** cow
núigè cows
náá-kpí'íŋ large cow
náá-kpíímà large cows
- (b) **kpá'áŋ** guinea fowl
kpíínè guinea fowls
kpé-'bíŋ small guinea fowl
kpé-'bísí small guinea fowls
- (c) **bùá** child
bàllí children
bùò-bíŋ small child
bàllí-bísí small children

The singular noun stem **naag-** 'cow' generally shortens to **naa-** in compounds, and it is this singular stem which is used in the plural adjectival form. Similarly, the singular noun stem **kpaa-** 'guinea fowl' (shortened and with a vowel change for ATR harmony) is used for the plural as well as the singular adjectival form. The noun 'child', as in (c), is the only other one besides 'thing' in my data which takes the suppletive plural stem when in a plural adjectival form.

Kɔnni does not allow the infinite addition of adjectives to nouns. Three adjectives attached to a noun stem is the most I have in my data, and even these are quite infrequent. Mr. Amadu was able to produce a word with four adjectives, but said it was "never heard".

- (15) (a) **jà-kù-yèèlí-kpíí-'ká** the old big white thing
thing-old-white-big-the
- (b) **jà-háá'í-yèèlí-kpíí-'ká** the new big white thing
thing-new-white-big-the

A similar situation exists in the Gur language Dagaare, but in that language it is possible to have four or even more adjectives after the noun stem (Bodomo 1997).

The order of the adjective stems is at least somewhat restricted, and is as in (16) (for more details see Cahill 1999).

- (16) Nounstem--- 'old/new'---color---other adj.---derived adjectives

2. CLASS-DEPENDENT PHONOLOGY

2.1 CONSONANT DELETION

Deletion of consonants in Kɔnni is fairly rare. Here I present two cases of consonant deletion which depend on the noun class of the target noun.

2.1.1 g-deletion in noun classes 2 and 3

Quite a few nouns have stem-final /g/, as seen particularly in forms such as **kúg-úsí** 'trees (sp.)'.⁶ This final /g/ in this stem deletes before the singular suffix -**ń**, giving /kúg-ń/ → **kúń** 'tree (sp.)'. However, in other noun stems which end in /g/, e.g., **kúg-úrí** 'the cooking place' (cf. **kúg-è** 'cooking places', the /g/ does not delete, but an epenthetic vowel surfaces, giving /kúg-ń/ → **kúgúń** 'cooking place'.

- | | | | | | |
|------|---------------|----------------|----------------|---------------|-------|
| (17) | Citation form | Sg. definite | Plural | | class |
| (a) | kúń | kúk-ká | kúg-úsí | trees (sp.) | NC3 |
| (b) | kúg-úń | kúg-úrí | kúg-è | cooking place | NC1 |

The environments for the /g/ in the citation forms of these two words are virtually identical; there is no factor in the environment that can account for the differences. The synchronic pattern here can be traced back to the historical sources of these nouns, but a synchronic explanation must refer to the noun class to which the noun belongs.

In my database, there are 22 nouns which have a /g/ as stem-final consonant, but delete this /g/ in the singular. A sample of forms is given in (18). The forms in (18a) are from noun class 2, and the ones in (18b) are from noun class 3.⁷

- (18) g-final nouns from noun classes 2 and 3
- | | | | | |
|-----|----------------|-------------------|--------------------|-----------------------|
| | Singular | Sg. definite | Plural | |
| (a) | bǎń | bàk-kú | bàg-ítí | fiber (used for rope) |
| | hǎń | hàk-kú | hàg-ítí | shell, bark |
| | zàmpúń | zàmpúk-kú | zàmpúg-ítí | hedgehog |
| (b) | kúń | kúk-ká | kúg-úsí | tree (sp.) |
| | kpàjìń | kpàjìk-ká | kpàjìg-ísí | wart |
| | gbígbán | gbígbák-ká | gbígbág-ísí | tree (sp.) |

⁶The **u** of -**usi** is seen to be epenthetic by comparison to forms like the singular definite **kúk-ká** 'the tree (sp.)', where /g/ assimilates to a following /k/ in voicing.

⁷Interestingly, three nouns from noun classes 2 and 3 do have [g] in the citation form, e.g., **yí'gíń**, **yí'ká**, **yí'gísí** 'tree (another species), the tree, trees'. The difference here may be that these three have an underlying stem-final vowel: /yɪŋɪ-/, while the noun stems in (18) end in consonants. This is supported by the fact that **yí'ká** has a variant pronunciation **yí'kgí'ká**, but **kúkká** is never pronounced with a vowel between the consonants.

However, there are another 40 nouns in my data which have a non-deletable /g/ as a stem-final consonant. A sample of these is given in (19). Nouns in (19a) are from noun class 1; those in (19b), which are much less frequent, are either from noun class 4 or a mixed noun class.

(19) g-final nouns of noun classes 1 and 4

	Singular	Sg. definite	Plural	
(a)	múg-úŋ	múg-úrí	múg-à	river
	tíg-íŋ	tíg-írí	tíg-è	house
	kùŋchìàg-íŋ	kùŋchìàg-írí	kùŋchìàg-á	cornstalk
	kpàlìg-íŋ	kpàlìg-írí	kpàlìg-á	hawk
(b)	náá!g-íŋ	náá!g-íbú	núg-è	cow
	wàg-íŋ	wàg-íbú	wàg-ìtí	fight

To sum up, nouns which are identical in all relevant ways act one way when they are members of noun classes 2 and 3, and another way when from noun classes 1 and 4. (There are no nouns in noun class 5 which end in /g/.⁸) There is epenthesis in /wàg-íŋ/ → **wàgíŋ** 'fight' (19b), but deletion of /g/ in /hàg-íŋ/ → **hǎŋ** 'shell, bark' (18a). Any synchronic solution to this must refer to the noun classes as a phonological arbitrary label.

Historically, however, the development of these patterns (only noun classes 2 and 3 presently delete g, and these classes both have k in the definite suffix) was not arbitrary, as I now present briefly. We can gain insight as to how this situation arose by examining the common ancestor of Buli and Kɔnni. The noun class system of Buli is quite similar to Kɔnni, but preserves more features of the system from Proto-Buli-Kɔnni (Cahill 1997). The Buli data below is all from Kröger's (1992) Buli-English dictionary. Many nouns belong to the corresponding noun classes in both languages, but it is also quite common to find cognate nouns which belong to one noun class in Kɔnni and to a different one in Buli. Unsurprisingly, the exact glosses for the cognates may differ slightly, e.g., Kɔnni **múgúŋ** 'river' has the Buli cognate **mogi**, which is restricted to large rivers or a reservoir. The Kɔnni gloss is used below for consistency with the rest of this article, as is my numbering of noun classes rather than Kröger's.

Above, the presence or absence of stem-final [g] in the singular citation form of a noun was shown to be dependent on its noun class. In (20) and (21) are forms from two of these classes which have divergent behavior, Kɔnni noun class 1 and noun class 2. In (20), the stem-final /g/ is present in all forms in both Buli and Kɔnni.

(20) Noun class 1 (retains g in Kɔnni)

Kɔnni:	Buli:	
Singular, Sg. definite, Plural	Singular, Sg. definite, Plural	
jígíŋ, jígírí, jígê	jìgī, jìgini, jìga	place
múgúŋ, múgúrí, múgà	mógí, mógíní, moga	river
hààgíŋ, hààgírí, –	sagi, sagni, saga	bush

⁸The only exception may be **hə̀gú** 'woman', but it is uncertain whether the final vowel is underlying or epenthetic.

With the **g** always present in every form in (20), there is no question of its being part of the stem in Proto-Buli-Kɔnni (PBK). But this is not the case in forms from (21). In these noun stems, there is no **g** present in the Buli forms at all, but only **k**.

(21) Noun class 2 (deletes **g** in Kɔnni)

Kɔnni:	Buli:	
Singular, Sg. definite, Plural	Singular, Sg. definite, Plural	
yúŋ, yúkkú, yúgítí	yok, yoku, yokta	night
bǎŋ, bǎkkú, bǎgítí	bok, boku, bokta	fiber
bòllóŋ, bòllòkkú, bòllògítí	buluk, buluku, bulukta	armpit
hǎŋ, hàkkú, hàgítí	pak, paku, pakta	bark, shell

The **g** in the Kɔnni nouns above only surfaces in the plural forms, as noted before. In terms of historical development, all these **gs** are the result of a sound change in which intervocalic [k] changed to [g] in Kɔnni (Cahill 1995).⁹

(22) Posited historical development of ‘night’ (NC2) from Proto-Buli-Kɔnni (from Cahill 1997)

Kɔnni:		Buli:	
PBK *yuk	yukku	yuktr	PBK *yuk
↓	↓	↓	↓
yug	yukku	yugítí	yok
			yoku
			yokta

The [g] that has been the focus of this discussion has thus been present in all stages of development from PBK in noun class 1, but has only come about relatively recently in noun class 2. Synchronically there is no intervocalic voicing of voiceless stops in Kɔnni (Cahill 1999). This is a case of synchronic analysis being clearly different than historical development, since we analyze the present input form of ‘night’ in Kɔnni as /yug-/, but historically the root is *yuk-.

Although historically there was no **g** in the Kɔnni noun class 2/3 words like yúŋ ‘night’, it is consistent with the rest of Kɔnni phonology to analyze them with a **g** in present-day Kɔnni, and this **g** deletes in the citation form of the noun. This is not a general process in Kɔnni, for as we have seen, the noun class 1 and 4 noun stems which end in **g** regularly insert a vowel in the singular citation form, as in tígíŋ ‘house’. Therefore, in noun class 2/3 nouns, a stem-final **g** deletes before the singular suffix -ŋ, though not in the plural when it is prevocalic. This may be expressed with a rule, or as a morphologically-based constraint, as follows.

(23) ***g**_{NC2/3}: a **g** is disallowed stem-finally in citation forms of nouns of noun classes 2 and 3

The “citation form” is taken to be the singular indefinite, in isolation. Since the particular noun classes 2 and 3 referred to here are the Kɔnni noun classes, this constraint is language-specific.

2.1.2 *n*-deletion in noun class 1

Different nasals differ in their behavior with regards to deletion. Nouns with stem-final **m** or **ŋ** always add an epenthetic vowel before the singular suffix -ŋ, but

⁹This had the result that all cases of intervocalic **k** in present Kɔnni within words are in morpheme-initial position in compounds, or begin a nominal suffix, or are in borrowed words.

nouns with stem-final **n** sometimes epenthesize a vowel and sometimes delete the **n**. In a pattern similar to the **g** case above, whether epenthesis or deletion takes place depends on the noun class of the target noun.

Before proceeding to the deletion cases, I illustrate the cases of non-deletion. When the nasals /m/ or /ŋ/ are stem final in nouns, an epenthetic vowel is always inserted between that nasal and the singular nominal suffix /-ŋ/. Nouns with /m/ stem finally are quite common, while those with /ŋ/ stem finally in my data are limited to the four listed below. The nouns in (24) and (25) belong to noun classes 3 or 1 or a mix of the two.

(24) Retention of stem-final **m**

Singular	Sg. definite	Plural	
bùrìm-íŋ	bùrìn-ní	bùrìn-sí	oryx
dùm-íŋ	dùŋ-ká	dùn-sí	mosquito
gìm-íŋ	gìn-ní	gìm-é	sparrow
gbégím-íŋ	gbégín-ní	gbégím-è	lion
and many others			

(25) Retention of stem-final **ŋ** (complete list of examples in my data)

bíŋí'líŋ-íŋ	bíŋí'líŋ-ké	bíŋí'lín-sí	tree (sp.)
gbíŋgbí'ŋ-íŋ	gbíŋgbíŋ-!ké	gbíŋgbín-sì	chicken
kàmbòŋ-íŋ	kàmbòŋ-ké	kàmbòn-sí	Twi language
ɲìŋ-íŋ	ɲìŋ-ké	ɲìŋ-é	driver ant

In contrast, nouns which demonstrably have stem-final /n/, as seen by the pre-vocalic form of the noun stem, show two patterns of behavior. In some nouns, the /n/ acts as the other nasals in (24) and (25), and an epenthetic vowel is inserted between the /n/ and the singular suffix /-ŋ/, as in the examples in (26). However, the majority of nouns with /n/ stem-finally delete this /n/ before the suffix /-ŋ/, as in the examples in (27). The lists in both (26) and (27) include all the examples I have in my database.

(26) Retention of stem-final **n**

Singular	Sg. definite	Plural	
bùùn-íŋ	bùùm-bú	bùùn-é	boundary
yàn-íŋ	yàn-ní	yàn-á	frog
bùn-íŋ	bùŋ-ká	bùn-sí	donkey
gá'n-íŋ	gáŋ-!ká	gán-sì	thin rope
gbán-íŋ	gbáŋ-ká	gbán-sí	skin
pón-íŋ	póŋ-ké	pón-sí	tree (sp.)

(27) Deletion of stem-final **n**

běŋ	bèn-ní	bèn-é	tribal face scar
bĩŋ	bìn-ní	bìn-á	year
dààkpǎŋ	dààkpàn-ní	dààkpàn-á	bachelor
dũŋ	dùn-ní	dùn-é	knee
gìŋgáŋ	gìŋgàn-ní	gìŋgàn-á	drum (sp.)
jìŋmín	jìŋmín-ní	jìŋmín-à	evening

nín	nín-ní	nín-à	tooth
tǎŋ	tàn-ní	tàn-á	stone
tàngbǎŋ	tàngbàn-ní	tàngbàn-á	land god
wú!tǎgbǎŋ	wútàgbàn-ní	wútàgbàn-á	lizard (sp.)
dùúŋ	dùùm-bú	dùùn-é	horse
gú!úŋ	gúúm-!bú	gúún-è	rope
nín	ním-bú	nín-è	eye
wú!úŋ	wúúm-!bú	wúún-è	genet

The pattern of deletion seems to be related to the noun classes, as was *g*-deletion in the previous section, but the pattern here is not quite as straightforward. One pattern to note is that every single one of the nouns in which /n/ deletes in (27) has a plural form showing the noun class 1 suffix *-a/-e*, but only two of the forms in (26) do. Of the nine Buli forms which I have been able to identify as cognates of the above forms, the seven corresponding to nouns in (27) also have noun class 1 endings, and both the Buli nouns corresponding to nouns in (26) have noun class 3 endings. As a general pattern, then, nouns which have plurals in noun class 1 delete the /n/. These nouns may be simply in noun class 1 with all their suffixes, or may be in a “mixed class”, with only the plural suffix belonging to class 1. However, this leaves the words for ‘boundary’ and ‘frog’ in (26) as anomalies; they both have noun class 1 plural suffixes, but do not delete the /n/. Thus, we will have to either mark these two as true exceptions to the generalization of noun class 1 *n*-deletion, or else abandon the idea of connecting *n*-deletion to any morphological *or* phonological class, and just mark all the nouns in either (26) or (27) arbitrarily as undergoing the process or not. On the notion that it is better to have a generalization with a few exceptions rather than create two arbitrary classes, I propose a constraint similar to the one in the previous section, which prohibits the stem-final *n* in noun class 1 nouns.

- (28) **n*_{NC1}: a *n* is disallowed stem-finally in citation forms of nouns which belong partially or wholly to noun class 1

As written, any noun which is wholly in class 1 or one that has mixed morphology is covered by this constraint. As it happens, the only *n*-final noun stems with mixed morphology are those with class 1 plurals; there are no *n*-final noun stems which have only the singular definite suffix from class 1. The constraint in (28) is another language-specific one, referring to the Kɔnni noun class 1. With this constraint in place, we account for all the nouns above except for *bùùnín* ‘boundary’ and *yàníŋ* ‘frog’, which must remain exceptional. Truly, there is no way in the same set of rules or constraints to account for the fact that *yàníŋ* does not delete the stem-*n*, while *tǎŋ* ‘stone’ does, without an arbitrary marking of one or the other.

2.2 TONAL POLARITY IN NOUN CLASS 1 PLURALS

Though all other nominal suffixes are H-toned, as seen in (3), the noun class 1 plural¹⁰ suffix is consistently opposite in tone to the preceding tone. Before discussing the Kɔnni in detail, I review other researchers’ approaches to “polar” suffixes in Gur languages.

¹⁰An expanded discussion and Optimality Theory analysis of these polar tones appear in Cahill (1998, 1999).

Kenstowicz, Nikiema, and Ourso's influential 1988 study of two Gur languages noted that in many or most nouns, the nominal suffix has a tone opposite to that of the noun stem. In Moore, disyllabic nouns have one of the three patterns LH, HL, or HH, but never LL. These researchers analyze this and a similar pattern in Lama by hypothesizing that all suffixes have a lexical H tone, but the stems are either H, L, or toneless. An underlying /L-H/ sequence surfaces as an unchanged [LH], a /H-H/ sequence changes to [HL] by a version of Meeussen's rule (Goldsmith 1984), and an underlying /m-H/ surfaces as [H-H] as a result of spreading the only H tone present. So in Kenstowicz, et al's analysis of Moore, the apparent tonal polarity is actually an epiphenomenon, the result of other processes. Hyman (1993) proposes a similar analysis for the related Gur language Dagbani.

One aspect of this analysis is similar to Kɔnni. As argued above, suffixes on most nouns in Kɔnni are H-toned. This is seen by the fact that, unlike Moore, most Kɔnni suffixes do *not* alternate, but always surface as H-toned.

However, the plurals of noun class 1 in Kɔnni behave in a way inconsistent with the other suffixes. These are exemplified by the forms in (29). The suffix on the plural form is either *-a* or *-e*, depending on vowel harmony, and this suffix is not surface H-toned, but exhibits tonal polarity, surfacing with a tone opposite to the previous stem tone.

(29)	Singular	Root plural	Pl. tone	Suffix tone	
	tǎŋ	tàná	L	H	stone/s
	síŋ	sîà	H	L	fish/es (sp.)
	wíŋ	wîè	H	L	face mark/s
	bîisíŋ	bîisá	L	H	breast/s
	yîisíŋ	yîisé	L	H	antelope
	tígíŋ	tígè	H	L	house/s
	kùŋchìàgíŋ	kùŋchìàgá	LL	H	cornstalk/s
	sìkpááŋ	sìkpára	LH	L	heart/s

The general Moore analysis using underlying H tones for the suffixes cannot be applied to Kɔnni. Recall that the *-ŋ* singular suffix is H-toned. If the plural suffix *-a/-e* is also H, we would expect the same tonal patterns in the singular as in the plural, but instead we find two distinct patterns in the singular and plural. The singular always ends in a H tone, but the plural ends in a tone opposite to the last tone of the noun stem. Moreover, the plurals of noun class 1 are the only ones which act in this manner.

So this *particular* morpheme of Kɔnni is an apparently polar-toned suffix, in contrast with Moore, in which *all* noun suffixes were apparently polar-toned. In Moore, both the nouns which did and did not exhibit surface polarity could be analyzed with the same set of rules, to give a unified, non-polar account. In Kɔnni, most nouns do *not* have polarity; the polar suffix is the exceptional one. Positing a lexical H tone with no additional machinery is unworkable, since this would lead to the same behavior as the other suffixes, which are definitely H-toned.

Since the suffix often surfaces as L, the possibility of a lexical L tone on the "polar" suffix is a hypothesis worth examining. While the Kɔnni plural suffix cannot be H-toned underlyingly, neither can it be L-toned underlyingly. In a L-tone scenario, the suffix is L but changes to H because a word is required to contain a H tone by a constraint H-PRESENT (see Cahill 1999 for details). However, the case of **tànáhá** 'the

stones' creates problems for this analysis. This word is divided into morphemes as **tàn-á-há**. If the plural suffix **-a** is underlyingly L-toned, there is no motivation for it to change to H, since a H is already present in the definite suffix **-há**. Neither is there a process that spreads a H tone onto a L as in this case. A L tone for the "polar" suffix in the general system proposed thus far is therefore unsupported.

So neither a H nor a L lexical tone for the noun class 1 plural suffix is sufficient to account for the facts. (I consider an OCP-based account referring to noun class 1 below.) The last representation-based solution available is that the suffixes of noun class 1 in Kɔnni are toneless. Antilla and Bodomo (1996, forthcoming) discuss a polarity-type phenomenon in Dagaare, another Gur language, which is very similar to that of Moore. However, in their analysis, all nominal suffixes in Dagaare are underlyingly toneless. For disyllabic nouns, they have the same tone patterns as Moore did: LH, HL, and HH, but not LL. If the root is toneless, Antilla and Bodomo's analysis inserts a default H, which spreads to both syllables, giving surface HH. If the root has a L lexical tone, this H default produces a LH surface tone. If the root has a H lexical tone, the OCP, acting as a specific constraint, ensures that the inserted tone is not identical to the root tone but is opposite, giving surface HL. It may be possible to re-analyze Moore in the same way, with toneless suffixes. Kenstowicz, et al. (1988) had rejected the insertion of H tones for Moore on the grounds that Pulleyblank (1986) had shown that the default in a L-H tonal system is typically L, not H. More recently, however, Clark (1990) and Creissels and Grégoire (1993) have analyzed Igbo and Manding, respectively, as having a H tone as the default. Unlike Antilla and Bodomo's account of Dagaare, however, the L tone is clearly the default in Kɔnni (see Cahill 1999 for discussion), and so we must seek another analysis.

I propose a constraint-based analysis based on the Optimality Theory framework (Prince and Smolensky (1993), McCarthy and Prince (1995)); for a detailed look at this analysis, see Cahill (1998, 1999)). In this article, I simply sketch the most relevant arguments leading to the polar constraint to be proposed below.

Besides the basic forms illustrated above, several forms exist that illustrate more complex data, but the same basic pattern of polarity, even when the plural definite suffix **/-há/** is added.

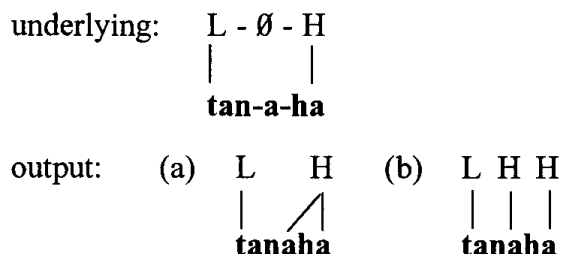
(30)	Singular	Plural	Pl. definite	
	jágín	jágâ	jágá¹há	shelter/s
	tǎŋ	táná	tánáhá	stone/s
	yí¹ín	yíímà	yí¹máhá	arrow/s

At least some words must insert a tone for the polar suffix. This is clear in the case of words like **jágâ** 'shelters', which as a noun of noun class 1 has the plural suffix **-a** (singular **jágín**). The word **jágâ** has two lexical H tones, with the second H combined with a L to make a falling tone on the second syllable. This is tonally similar to **sîâ** 'fishes (sp.)' from (29), in that these both have falling tones on the last TBU of the word. In **sîâ** this is visually obscured by the fact that the falling tone is spread over a diphthong (the TBU in Kɔnni is the syllable rather than the mora). Other polysyllabic cases such as **kɔ̀bîê** 'lice' and **dààgbúgê** 'stumps' also exist.

However, in forms like **tánáhá** (**/tàn-a-há/**) 'the stones', the source of the polar tone is uncertain. One possibility is that the toneless second syllable receives its H tone by spreading from the suffix **-há**, as in (31a). This is consistent with the rest of Kɔnni

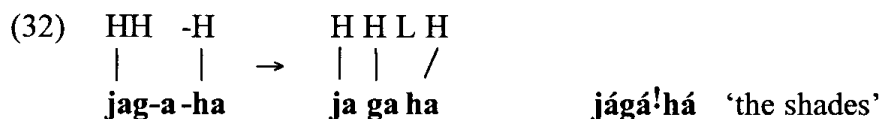
tonology; most spreading in Konni is right-to-left, and H tone is the tone that spreads, rather than L. However, a second possibility, that of an inserted polar tone, also exists, as in (31b). In this case, the **-a** receives an inserted tone which has the value of H from polarity to the preceding stem tone, and the **-há** has a lexical H. It is impossible to decide between these two phonetically identical representations for this word.

(31) Possible sources of H tone on **tànáhá** 'the stones'



Up to this point, the forms may all be accounted for by the insertion of a tone opposite to the last noun stem tone. However, the set of words like **yíímà** 'arrows' shows a simple insertion will not always work. The citation and definite singular form of 'arrow' (**yí'íŋ** and **yí'írí**) show by the downstep that the root **yíí** must have a HL underlying tone. But this is exactly the tone that appears on the plural form **yíímà**, with no modification. If there were an obligatory inserted polar tone, this would be H in this case to contrast with the final L in the root, and we would expect that stem-final L to float, with the unattested result ***yíí'má**. There is nothing inherently ill-formed about this unattested result, so a rule-based analysis is hard-pressed to account for it. However, in a constraint-based account, in which surface forms are evaluated for how well they satisfy constraints, this fits quite nicely.

One more complexity is one in which a L polar tone is inserted, but ends up floating and causing downstep, as in **jágá'há** 'the shades', which would have the configurations in (32).



The basic generalization for all these is that the last tone of the plural suffix is opposite to the one before. This is true whether there is an inserted tone on the suffix, as in **tàná**, **tígè**, **jágâ**, a possibly spread tone as in **tànáhá**, whether the last tone of the word is an underlying tone of the root as in **yíímà**, or whether the polar tone is floating as in **jágá'há**. So rather than have an inserted tone as a necessary part of the suffix, we will have a surface-true polar constraint. If it is necessary to insert other tones, they will follow from the interaction of polar and other constraints, but if the underlying representation already satisfies the polar constraint, the tones remain as in the underlying representation.

(33) Polar: in a noun class 1 plural, the last tone of the plural is opposite in value to the immediately preceding tone

This precise definition of polar is crucial to account for all the data in an OT framework. Above, I define "the plural" as noun stem + plural suffix, but *not* including any plural definite suffix that may be present. In what sense is the polar tone "the tone of the plural", as polar refers to it, in downstep, when the inserted polar tone is

not associated to anything, let alone the plural morpheme? I take the “tone of the plural” to mean the last tone of a plural noun which precedes a tone contributed by a morpheme which follows the plural morpheme, whether it be the plural definite morpheme or another word altogether. So in forms like **jágá'há**, there is a polar tone and polar is satisfied even when the polar tone is floating.

Alternative analyses which do not incorporate a polar constraint either fail or are less adequate for one reason or another. The OCP is not generally active in Kɔnni, but a lexical H tone for the noun class 1 plural, combined with a version of the OCP restricted to this particular morpheme could account for most cases. However, the problem comes in the form **yíimà** ‘arrows’. Here the noun stem has a HL lexical tone, as seen in the citation and singular definite forms **yí'ín** ‘arrow’ and **yíí'rí** ‘the arrow’. A lexical H for the plural would be adjacent to the stem L and so be allowed by the OCP. The result would be a HLH for ‘arrows’, with expected association as in (34).

- (34) H L H
 | |
 yíí **má**

The configuration in (34) would be pronounced as ***yíí'má**, which is not the attested form. This tonal configuration is attested and even common in Kɔnni. As far as is known, there are no deletions of H tones in Kɔnni. So the combination of having a lexical H for the noun class 1 plural and an OCP_{NC1} constraint is unworkable.

The phenomenon of Kɔnni polarity is particularly suited to Optimality Theory, since it illustrates a “conspiracy”. The surface phenomenon is expressed in the constraint polar, but this polar tone may have any of several sources: an inserted tone, an underlying tone, or possibly even a spread tone. A rule-based account would need several separate rules to account for this, including a basic one of the form $T \rightarrow -\alpha T / \alpha T$ —, where the alpha notation is necessary to produce an opposite value of a particular feature (Schuh 1978). A rule of this type still must refer to the noun class 1 plural, and involves insertion of a polar tone with later deletions in some cases, as in the case of **yíimà** ‘arrows’, where additional machinery is required to avoid the expected configuration in (34).

3. DISCUSSION AND CONCLUSION

We have seen three processes in Kɔnni which occur only in particular noun classes. In one of these, the case of **g**-deletion, we have traced this synchronic arbitrariness to regular historical processes. There was a similar historical process leading to the case of **n**-deletion as well (Cahill 1997). It is also possible that the tonal polarity phenomenon of Kɔnni will also turn out to have a historical basis, as Hyman and Schuh (1974) suggest is generally the case for synchronic polarization rules.

One of the claims of most proponents of Optimality Theory (e.g., Prince and Smolensky 1993, McCarthy and Prince 1993, Archangeli 1997) is that all constraints are universal. However, Russell (1997) notes that since some constraints refer to morphemes, and these morphemes are not universal, then the constraints referring to these morphemes cannot be universal either. He gives examples from Tagalog and Mohawk.

The three constraints discussed from Kɔnni, of course, parallel this. The constraint abbreviated as ***g_{NC2/3}** in (23) (a **g** is disallowed stem-finally in citation forms of nouns of noun classes 2 and 3) is similar to those cited by Russell in that it is an

extremely specific constraint and refers specifically to a particular class of Kɔnni morphemes, noun classes 2 and 3, which of course no other language possesses. The constraint abbreviated as **n_{NC1}* in (28) (an *n* is disallowed stem-finally in citation forms of nouns which belong partially or wholly to noun class 1) is similar to the above in that it must refer to a class of morphemes which only Kɔnni possesses. Finally, the constraint polar in (33) (in a noun class 1 plural, the last tone of the plural is opposite in value to the immediately preceding tone), also crucially refers to noun classes which do not exist in any language other than Kɔnni. These examples strengthen Russell's claim that not all constraints in Optimality Theory are universal.

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