

KOLA PHONOLOGY

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Presented in this paper is a phonological analysis of the main dialect of Kola, an Austronesian language spoken in the northern part of the Aru archipelago. One uniqueness of Kola is that there is no bilabial voiceless stop /p/, in spite of contrasts between voiced and voiceless velar and alveolar stops (/d/ and /t/, /g/ and /k/). Instead, Kola manifests voiced and voiceless bilabial fricatives (/β/ and /q/) which occur in free variation with one another, and also contrast with the labiodental fricative /f/. A discussion of Kola stress placement, syllable structure, and morphophonemic processes is included. Of particular interest are the rules for reduplication in Kola. A set of three ordered rules are proposed. Reduplication is also an important factor in the interpretation of ambiguous phonological segments in Kola.

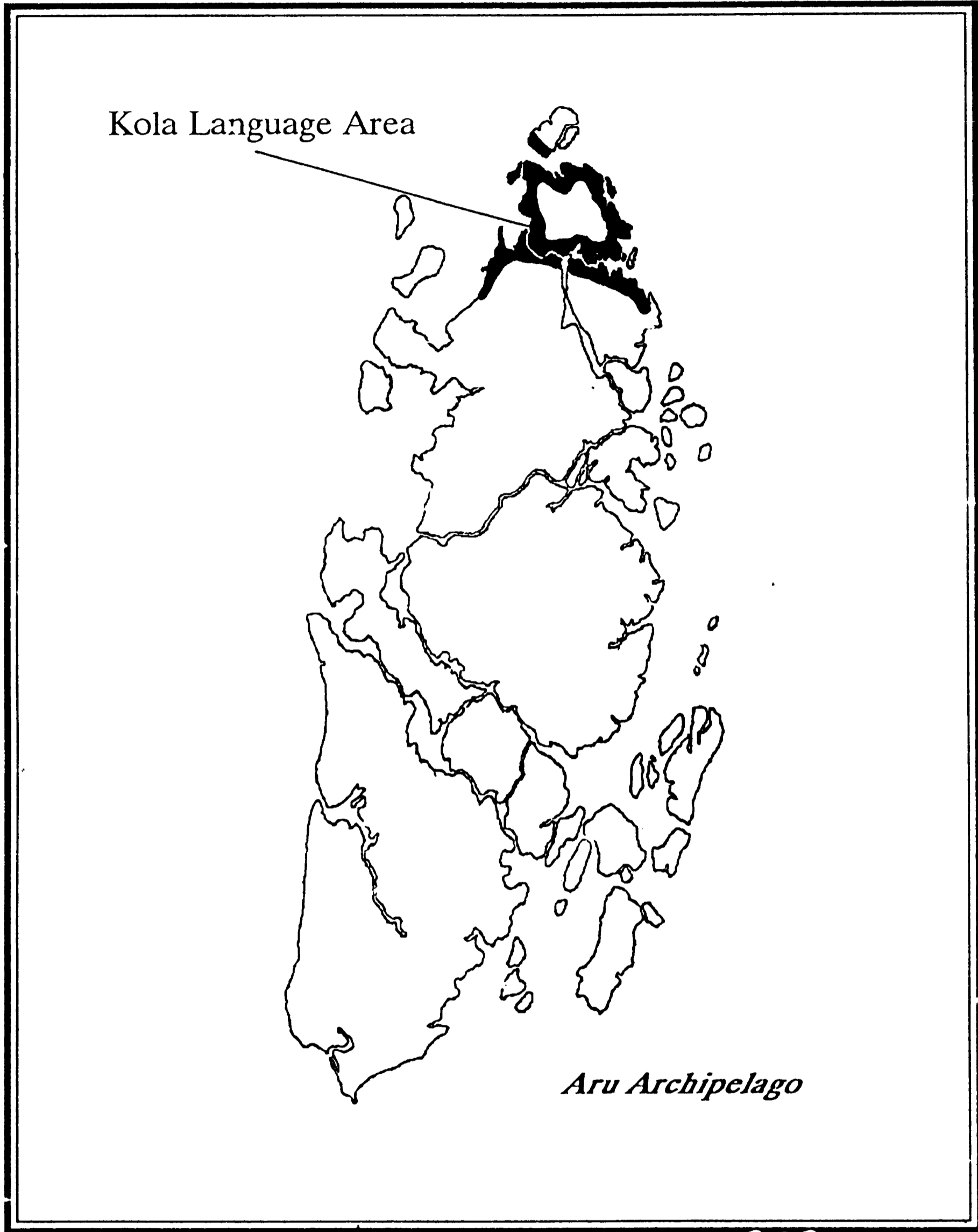
1 INTRODUCTION

This paper is the result of phonological research in the Kola language of the Indonesian province of Maluku. Kola is spoken by nearly 6,000 people in 22 villages in the extreme north of Aru, all round the coast of Kola Island and on adjacent islands. The Kola language belongs to the Aru language family and shares a superstock with the languages of Kei and Tanimbar. That is, they are members of the Central Malayo-Polynesian superstock, a major subdivision of the Austronesian Phylum (Hughes 1987). The present study is based on data gathered over a period of three years in the two villages of Kolamar (Wahkolamah) and Marlasi (Medan) on the east coast of Kola island. Prior to this study, linguistic research in Kola has been limited to cursory surveys and word lists (Collins 1982, Hughes 1987).

2 PHONOLOGICAL SEGMENTS

2.1 Inventory of Phonemes

Kola, as spoken in Kolamar and Marlasi, has 16 consonants /t, k, b, d, g, β, f, s, h, m, n, ŋ, l, r, w, y/ and 5 vowels /i, e, a, u, o/. This system of phonemes is shown in the following charts:



Map 3: Kola Language Area

Consonants

	Bilabial	Labio-Dental	Alveolar /Palatal	Velar /Glottal
Vl. Stops			t	k
Vd. Stops	b		d	g
Fricatives	ɸ	f	s	h
Nasals	m		n	ŋ
Lateral			l	
Vibrant			r	
Semivowels	w		y	

Vowels

	Front	Central	Back
High	i		u
Low	e	a	o

In spite of the contrast between the alveolar stops /d/ and /t/ and between the velar stops /g/ and /k/, Kola does not have a bilabial voiceless stop except as an allophone of the phoneme /b/ when it immediately precedes a voiceless stop. This gap in the voiceless stop inventory is somewhat compensated for by the presence of both bilabial and labio-dental fricatives, /ɸ/ and /f/, respectively. It is interesting that Indonesian loan words containing a voiceless bilabial stop are assimilated into Kola as /b/ rather than /ɸ/. For example Indonesian /kapal/ 'ship' becomes Kola [kabal] not *[kaɸal].

2.2 Description of Phonemes

The following are formational statements for each of the Kola phonemes.

/t/ [t̚] Voiceless alveolar unreleased stop; occurs in syllable-final position.

[t] Voiceless alveolar stop; occurs elsewhere.

/'ɸunit/	['ɸunɪ t̚]	'thick'
/at'meta/	[a t̚ 'meta]	'eyes'
/ata'ɸon/	[ata 'ɸon]	'deaf'
/'takih/	['takɪ h]	'ear'
/'mataŋ/	['mataŋ]	'my eye'

/k/ [k̚] Voiceless velar unreleased stop; occurs in syllable final-position.

[k] Voiceless velar stop; occurs elsewhere.

/ak/	[a k̚]	'I'
/ak'lakuh/	[a k̚ 'lakɪ h]	'broom'
/muk/	['mu k̚]	'banana'
/'nahak/	[na ha k̚]	'year, old'
/'aka/	['aka]	'for'
/'kolay/	['kolay]	'black-soil land'
/'kanaka/	[ka 'naka]	'do not'
/'lokih/	['lokɪ h]	'white'

/b/ [p] Voiceless bilabial stop; occurs immediately before a voiceless stop in a stressed syllable.

[b] voiced bilabial stop; occurs elsewhere.

/ab'kobil/	[ap'kobil]	'pressure'
/bub'tebi/	[bɪp'teβɪ]	'to slow'
/'bosil/	['bosɪl]	'small'
/du'bam/	[dɪ'bam]	'seven'
/gu'tebih/	[gɪ'teβih]	'fine, soft'
/haba'beh/	[haba'beh]	'red'

/d/ [ɾ] Voiced alveolar flap; occurs immediately preceding a stressed syllable.

[d] Voiced alveolar stop; occurs elsewhere.

/ad'kodih/	[aɾ'kodih]	'young woman'
/ad'φidi/	[aɾ'φidɪ]	'pain'
/'tudun/	['tudɪn]	'carry on one's head'
/'dekih/	['dekɪh]	'dry land'
/a'dom/	[a'dom]	'he works'

/g/ [k] Voiceless velar stop; occurs immediately before a voiceless stop in stressed syllables.

[g] Voiced velar stop; occurs elsewhere.

/ag'togih/	[ak'togih]	'straight'
/'gamah/	['gamah]	'sky, heaven'
/maha'gay/	[maha'gay]	'light'
/aga'wa/	[aga'wa]	'he understands'

/φ/ [φ] Voiceless bilabial fricative; occurs in free variation with [β].

[β] Voiced bilabial fricative; occurs in free variation with [φ].

/'φat/	['φa ^t]	~	['βa ^t]	'stone'
/'φeφ/	['φeβ]	~	['βeβ]	'wild pig'
/a'toφal/	[a'toφal]	~	[a'toβal]	'he washes'
/a'φan/	[a'φan]	~	[a'βan]	'he falls'
/a'φeha/	[a'φeha]	~	[a'βeha]	'he rows'

/f/ [f] Voiceless labio-dental fricative.

/'fahi/	['fahi]	'rice'
/fuh/	[fuh]	'ten'
/af'kaf/	[af'kaf]	'butterfly'
/ah'faw/	[ah'faw]	'he burns'
/'ifa/	['ifa]	'who'

/s/ [s] Voiceless grooved alveolar fricative.

/ku'so/	[kɪ'so]	'I see'
/fa'nis/	[fa'nis]	'bat'
/sa'mayah/	[sa'mayah]	'good'
/'sual/	['suwal]	'hold'
/as'tosi/	[as'tosi]	'short'

/h/ [h] Voiceless glottal fricative.

/'luha/	['luha]	'oil'
/ha'tudu/	[ha'tudɪ]	'sago dish'
/'hawih/	['hawih]	'bright'

/'bohi/	['bohɪ]	'black'
/ah'dom/	[ah'dom]	'he works'

/l/ [l] Voiced alveolar lateral.

/tol/	[tol]	'rope'
/muh'lan/	[mɪh'lan]	'you speak'
/'lah/	['lah]	'sail'
/'luan/	[luwan]	'load'
/'abil/	['abɪl]	'inside'

/r/ [r] Voiced alveolar vibrant.

/'tor/	['tor]	'chicken'
/'rihi/	['rihɪ]	'thorn'
/'rui/	['ruwi]	'two (animate)'
/re'lih/	[re'lih]	'local language'
/am'tarah/	[am'tarah]	'you chop'
/ar'dor/	[ar'dor]	'continue'

/m/ [m] Voiced bilabial nasal.

/'kama/]'kama]	'we (excl)'
/mima'nam/	[mima'nam]	'we eat a meal'
/muk/	['muk]	'banana'
/'mcha/	['moha]	'daytime'
/a'num/	[a'num]	'he dives'
/a'ma/	[a'ma]	'he comes'

/n/ [n] Voiced alveolar nasal.

/man/	['man]	'bird'
/nih/	['nih]	'spit'
/'nahak/	['naha ^k]	'year'
/'nuh/	['nuh]	'coconut'
/'anun/	['anɪn]	'wind'
/a'noka/	[a'noka]	'he says'

/ŋ/ [ŋ] Voiced velar nasal.

/ku'waŋah/	[kɪ'waŋah]	'I get up'
/'ɸuŋah/	['ɸuŋah]	'lemon'
/'ŋahin/	['ŋahɪn]	'name'
/'welŋ/	['welŋ]	'my brother'
/'amaŋ/	['amaŋ]	'my father'

/w/ [w] Voiced rounded labio-velar semivowel.

/kuh'naw/	[kɪh'naw]	'I teach'
/wil/	['wil]	'head'
/'weh/	['weh]	'water'
/'wawa/	['wawa]	'small, child'
/wa'hoh/	[wa'hoh]	'afternoon'
/'awa/	['awa]	'snake'

/y/ [3] Voiced alveo-palatal grooved fricative; occurs in free variation with [y] in the onset of a stressed syllable.

/na'yer/	[na'yer]	~	[na'3er]	'as, like'
/wa'yama/	[wa'yama]	~	[wa'3ama]	'father'
/'yamih/	['yamɪh]	~	['3amɪh]	'fast'
/'yoba/	['yoba]	~	['3oba]	'enough'

[y] Voiced unrounded palatal nonsyllabic vocoid; occurs elsewhere.

/ay'biyan/	[ay'biyan]	'midwife'
/ba'hiyan/	[ba'hiyan]	'when'
/say'mayah/	[say'mayah]	'good'
/ha'biya/	[ha'biya]	'sago'

Vowels:

/i/ [ɪ] Voiced high open front unrounded vocoid; occurs in unstressed syllables.

/'bohi/	['bohɪ]	'black'
/'lokih/	['lohɪh]	'white'
/wil'tabih/	[wɪl'tabɪh]	'head'
/'abil/	['abɪl]	'inside'

[i] Voiced high close front unrounded vocoid, occurs elsewhere.

/'mil/	['mɪl]	'go back'
/ni/	[nɪ]	'he'
/'lih/	['lɪh]	'throat, voice'
/'ifa/	['ɪfə]	'who'
/'inaŋ/	['ɪnəŋ]	'my mother'

/e/ [e] Voiced low close front unrounded vocoid.

/'kena/	['kenə]	'friend'
/ne/	[nə]	'it'
/e/	[e]	'that'
/'eta/	['etə]	'tall'
/ah'beh/	[ah'beɦ]	'red'

/a/ [a] Voiced low open central unrounded vocoid.

/'kala/	['kala]	'skin'
/man/	[mən]	'bird'
/a/	[a]	'this'
/a'moha/	[a'moha]	'the day after tomorrow'

/u/ [u] Voiced high close back rounded vocoid, occurs in stressed syllables.

/'timuh/	['tɪmɨh]	'east'
/ku'bana/	[kɨ'bana]	'I go'
/ha'tudu/	[ha'tudɨ]	'sago dish'

[ɨ] Voiced high close central unrounded vocoid; occurs elsewhere.

/'kukoŋ/	['kukoŋ]	'myself'
/'luhi/	['luɦɪ]	'clean'
/a'ɸun/	[a'ɸun]	'he kills'
/ay'tubih/	[ay'tubɪh]	'calf'
/ur/	[ur]	'grass'

/o/ [o] Voiced low close back rounded vocoid.

/'kolay/	['kolay]	'land'
/bom/	[bom]	'bamboo'
/ɸo/	[ɸo]	'dog'
/'mona/	['mona]	'front'
/ataɸon/	[ata'ɸon]	'deaf'
/ot/	[ot]	'one'

2.3 Statements of Contrast

The labial consonants /b, ϕ , f, m, w/ contrast initially as follows:

/buy/	['buy]		'betel palm'
/ ϕ uy/	[' ϕ uy]	~ [βuy]	'lost, gone'
/fuy/	['fuy]		'enter'
/muy/	['muy]		'nail'
/ban/	[ban]		'from'
/man/	[man]		'bird'
/ ϕ at/	[ϕ a ^t]	~ [βa ^t]	'stone'
/fat/	[fa ^t]		'contents'
/wat/	[wa ^t]		'strait'

The labial consonants contrast intervocalically as follows:

/a'ban/	[a'ban]		'he goes'
/a' ϕ an/	[a' ϕ an]	~ [a'βan]	'he falls'
/a'fan/	[a'fan]		'he sews sago thatch'
/a'ma/	[a'ma]		'he comes'
/a'wan/	[a'wan]		'he sells'
/a'taba/	[a'taba]		'he carries'
/a'to ϕ al/	[a'to ϕ al]	~ [a'toβal]	'he washes clothes'
/'tafan/	/'tafan]		'not yet'
/'tama/	/'tama]		'meat'
/a'tawa/	[a'tawa]		'he marries'

The labial consonants contrast finally as follows:

/kom/	[kom]	'I do'
/ken'ko ϕ /	[ken'ko ϕ]	'grip'
/af'kaf/	[af'kaf]	'butterfly'
/a'lakaw/	[a'lakau]	'he steps over'

The voiced bilabial stop /b/ never occurs word finally.

The alveolar/palatal consonants /t, d, s, l, r, n, y/ contrast initially as follows:

/'toghi/	['toghi]	'flat, level'
/'dodim/	['dodim]	'dark'
/'sowih/	['sowih]	'he dies'
/'lokih/	['lokih]	'white'
/'roqi/	['roqi]	'burnt'
/'noham/	['noham]	'chisel'
/'yowih/	['yowih]	'cold, cool'

The alveolar/palatal consonants contrast intervocalically as follows:

/'watay/	['watay]	'turning'
/'wadal/	['wadal]	'pan, pot'
/'wasah/	['wasah]	'lie'
/'walah/	['walah]	'dancing'
/'wara/	['wara]	'so that'
/'kanam/	['kanam]	'your'
/sa'mayah/	[sa'mayah]	'good'

The alveolar/palatal consonants contrast finally as follows:

/tal/	[tal]	'we(incl) take'
/tas/	[tas]	'we(incl) dig'
/tan/	[tan]	'star'

/fat/	[fa ^t]	'contents'
/fay/	[fay]	'empty'
/nar/	[nar]	'long'

The voiced alveolar stop /d/ never occurs word finally.

The velar/glottal consonants /k,g,h,ŋ/ contrast initially as follows:

/'kama/	['kama]	'we (excl)'
/'gamah/	['gamah]	'heaven'
/'hawih/	['hawih]	'bright'
/'ŋahan/	['ŋahan]	'my name'

The velar/glottal consonants contrast intervocalically as follows:

/'aka/	['aka]	'for, to'
/'aga'wa/	[aga'wa]	'he understands'
/'aha/	['aha]	'gills'
/'aŋa/	['aŋa]	'pole'

The velar/glottal consonants contrast finally as follows:

/'taŋ/	['taŋ]	'not'
/'motak/	['mota ^k]	'all'
/'a'tah/	[a'tah]	'he calls, he pushes'

The voiced velar stop /g/ never occurs word finally.

The nasal consonants /m,n,ŋ/ contrast initially as follows:

/'mawah/	['mawa ^h]	'on'
/'nahak/	['naha ^k]	'year'
/'ŋaha/	['ŋahan]	'my name'

The nasal consonants contrast intervocalically as follows:

/'kama/	['kama]	'we(excl)'
/'tama/	['tama]	'meat'
/'ta'kana/	[ta'kana]	'common, usual'
/'taŋa/	['taŋa]	'not'

The nasal consonants contrast finally as follows:

/'abum/	['ab ^ɪ m]	'your grandfather'
/'yabun/	['yab ^ɪ n] ~ ['ʒab ^ɪ n]	'sweat'
/'abuŋ/	['abiŋ]	'my grandfather'

The vowels, /i,e,a,u,o/ contrast initially as follows:

/'ika/	['ika]	'fish'
/'ekin/	['ekin]	'that'
/'akin/	['akin]	'this'
/'uk/	['uk]	'very'
/'okom/	['okom]	'species of shell'

The vowels contrast intervocalically as follows:

/til/	['til]	'stalk, stem'
/tel/	['tel]	'species of tall grass'
/tal/	['tal]	'we(incl) take'
/tul/	['tul]	'bone'
/tol/	['tol]	'rope'

The vowels contrast finally as follows:

/ 'bebi/	['bebi]	'flower'
/haba 'be/	[haba 'be]	'red'
/ 'daba/	['daba]	'grains'
/ 'babu/	['babu]	'grandpa'
/bo 'bo/	[bo 'bo]	'baby'

Although it can be difficult to detect /h/ in normal speech, especially when it occurs in word-final position, a tuned ear can differentiate /h/ with its absence. The following minimal pairs show this contrast:

/kasi/	['kasi]	'older sibling'	
/kasih/	['kasih]	'scratch'	
/ni/	[ni]	'he'	
/nih/	[nih]	'spit'	
/ɸu/	[ɸu]	'hair'	
/ɸuh/	[ɸuh]	'arrow'	
/tu/	[tu]	'again'	
/tuh/	[tuh]	'string'	
/we/	[we]	'mango'	
/weh/	[weh]	'water'	
/fe/	[fe]	'on, into'	
/feh/	[feh]	'kangaroo'	
/ 'waka/	['waka]	'mangrove'	
/ 'wakah/	['wakah]	'medicine'	
/ma/	[ma]	'come'	
/mah/	[mah]	'river'	
/ko/	[ko]	'because'	
/koh/	[koh]	'hit'	
/ɸo/	[ɸo]	~ [βo]	'dog'
/ɸoh/	[ɸoh]	~ [βoh]	'large bow net'

2.4 Interpretation of Ambiguous Segments

Ambiguous segments in word-final position may be interpreted either as semivowels or as vowels. The correct interpretation may be determined by a comparison with the reduplicated form of the word. Reduplicated forms, and the associated reduplication rules, are discussed in detail in Section 5.3.

/ 'kay/	['kay]	'wood'
/ 'kolay/	['kolay]	'land'
/tu 'bay/	[tu 'bay]	'new'
/ 'uy/	['uy]	'species of fish'
/say 'mayah/	[say 'mayah]	'good'
/ 'taw/	['taw]	'and'
/ 'palaw/	['palaw]	'house'
/aw 'faw/	[aw 'faw]	'burn'
/pui/	['puwi]	'fruit'
/rui/	['ruwi]	'two'
/ 'ui/	['uwi]	'species of fruit'
/rei/	['reyi]	'clever'

There are contrasts in identical environments, as shown by the pair of words below. For reference the reduplicated forms are shown to the right of the arrow:

/ʔuy/	[ʔuy]	'lost, gone'	-->	/ayʔuy/
/ʔui/	[ʔuwi]	'fruit'	-->	/ʔaʔui/

The ambiguous segments occur intervocally as well as word-finally. Intervocally, the sequences [iye], [iyu], [iya], [uwe], [uwi], and [uwa] may also be interpreted either as vowel clusters or as semivowels, in accordance with the rules predicting the correct reduplicated forms (Section 5.3). The reduplicated forms are shown to the right of the arrow in the examples below.

/ʔsual/	[ʔsuwal]	'hold'	-->	/saʔsual/
/ʔyuwar/	[ʔyuwal]	'sibling in law'	-->	/awʔyuwar/
/ʔbiyaŋ/	[ʔbiyaŋ]	'midwife'	-->	/ayʔbiyaŋ/

2.5 Stress

It is not predictable whether stress occurs on the penultimate or the ultimate syllable of monomorphemic words. Penultimate stress, however, is most common in Kola. It should be noted that stress falls only on the root and never on affixes or clitics. In addition, stress does not occur beyond the penult of the root. Examples of contrastive stress are shown below:

/ʔanen/	'a bird of paradise'
/ʔaʔnis/	'bat'
/ʔbobah/	'fear'
/boʔbo/	'baby'
/ʔaka/	'to, for'
/aʔka/	'he eats' (from /a/ 'he' + /ʔka/ 'eat')
/ʔtalah/	'sit'
/taʔlah/	'we sail' (from /ta/ 'we' + /ʔlah/ 'sail')

Stress shifts when compounds and contractions undergo resyllabification. If the second constituent of a compound begins with a stressed vowel, that vowel is incorporated with the final syllable of the first constituent of the compound, which will then carry primary word stress. Examples of this resyllabification are shown below:

/ʔnuh/	'coconut'	+ /ʔekin/	'that'	-->	/nuʔhekin/	'that coconut'
/ʔnen/	'that'	+ /ʔika/	'fish'	-->	/neʔnika/	'that is fish'
/taʔdom/	'we work'	+ /ʔutan/	'field'	-->	/tadoʔmutan/	'we work the field'
/ʔmoha/	'day'	+ /ʔa/	'this'	-->	/moʔha/	'today'

3 DISTRIBUTION

3.1 Syllables

The syllable in Kola consists of a vowel nucleus with an optional consonant and/or coda. Thus, there are four syllable types: V, VC, CV, and

CVC. The following are examples of these syllable types.

V and VC occur word initially and finally.

V occurs as follows:

/a/	V	'this'
/'rua/	CV.V	'two'
/'ifa/	V.CV	'who'
/'eta/	V.CV	'high'
/'esih/	V.CVC	'itch'

VC occurs as follows:

/as/	VC	'stab, thrust'
/ef/	VC	'fire'
/'auh/	V.VC	'he cuts'
/'rein/	CV.VC	'wise'
/en'tan/	VC.CVC	'press down'
/al'dala/	VC.CV.CV	'drum'

CV and CVC occur word initially, medially and finally.

CV occurs as follows:

/ɸo/	CV	'dog'
/a'ma/	V.CV	'he comes'
/'ema/	V.CV	'his father'
/'kauh/	CV.VC	'I cut'
/'sofi/	CV.CV	'wet'
/ɸa'nua/	CV.CV.V	'house'
/'lokih/	CV.CVC	'white'
/na'yer/	CV.CVC	'like, as'
/'haba'he/	CV.CV.CV	'red'

CVC occurs as follows:

/din/	CVC	'heavy'
/fut/	CVC	'ant'
/'esih/	V.CVC	'itchy'
/'dewar/	CV.CVC	'crab'
/du'bam/	CV.CVC	'seven'
/kaw'law/	CVC.CVC	'papaya'
/dah'koh/	CVC.CVC	'performance'

3.2 Phoneme Distribution

The following table shows the distribution of phonemes in the four syllable types.

	<u>V</u>	<u>V C</u>	<u>C V</u>	<u>C V C</u>
t		x	x	x x
k		x	x	x x
b		(x)	x	x
d			x	x
g		(x)	x	x
ɸ		x	x	x x
f		x	x	x x
s		x	x	x x
h		x	x	x x
m		x	x	x x
n		x	x	x x
ŋ		x	x	x x

	<u>V</u>	<u>V C</u>	<u>C V</u>	<u>C V C</u>
l		x	x	x x
r		x	x	x x
w		x	x	x x
y		x	x	x x
i	x	x	x	x
e	x	x	x	x
a	x	x	x	x
u	x	x	x	x
o	x	x	x	x

The distribution table above makes it clear that all vowels occur as the syllable nucleus. It should be mentioned, however, that rounded vowels rarely occur as the nucleus of a V syllable. In addition, while any consonant may occur in syllable-initial position, the voiced stops /b,d,g/ never occur in syllable-final position in CVC syllables. Although /b/ and /g/ have been observed in VC syllables, this occurrence is rare, and is usually only found as a result of reduplication (see Section 5.3).

3.3 Consonants

In Kola, consonant clusters do not occur within a syllable, however they do occur across syllable boundaries. The following table shows the combination of consonants across syllable boundaries.

		C ₂															
		t	k	b	ɔ	g	ɸ	f	s	h	m	n	ŋ	l	r	w	y
C ₁	t			x								x					
	k	x															
	b	x												x			x
	d																
	g									x		x			x		
	ɸ														x		
	f														x		
	s	x									x						
	h		x	x	x	x	x				x	x		x	x	x	x
	m		x	x				x						x	x	x	x
	n	x	x						x	x				x	x		
	ŋ	x		ɔ	x									x	x		
	l	x		x				x	x		x				x		
	r		x	x	ɔ	x	x	x			x			x		x	x
	w			x				x						x	x		
	y	x								x	x	ɔ		x	x	x	

Kola has many words which have nasals and continuants occurring in the final margin of the syllable and also word finally. Several examples are shown below:

/kom'ɸuy/	'I loose'
/ka'behil/	'tongue'
/'ɸalaw/	'house'
/'ɸulan/	'moon'
/'dodim/	'dark'
/'dewar/	'crab'
/'mas/	'you plant'
/sihiŋdama'liŋ/	'I forget'
/'sisuh/	'rub'
/af'kaf/	'butterfly'

Combinations of consonants with syllabic nasals have not been included

in the consonant cluster distribution table shown above. It should be noted, however, that Kola does have two morphemes which are syllabic nasals. These morphemes /-m/ and /-ŋ/ occur syllabically in word-final position, as shown in the following examples:

/ 'rean-ŋ/	'I am clever'
/ 'wam-ŋ/	'I am foolish'
/agur-ŋ/	'He hits me'
/wel-m/	'your younger brother'

3.4 Vowels

Any vowel may occur as syllable nucleus. Phonemes /e/ and /a/ also occur as monosyllabic words: /a/ 'this' and /e/ 'that'. Vowel clusters may occur word initially, medially and finally. However the allowed sequences of vowels are limited. Geminate vowels and several other vowel sequences do not occur. The following table indicates the allowed vowel sequences:

	V ₂				
	i	u	e	a	o
V ₁	i		x	x	
	u	x	x	x	
	e	x			
	a	x	x		
	o	x			

It can be seen that vowel clusters in Kola necessarily must include a high vowel. Several examples containing vowel sequences are shown below:

/φa'φui/	'fruits'
/'luan/	'load'
/ra'rein/	'clever'
/'auh/	'he cuts'

4 THE PHONOLOGICAL WORD

The phonological word in Kola is defined as a stress group, containing one or several syllables, one of which receives primary stress. This stressed syllable is considered to be the nucleus of the phonological word. The following list shows examples of the various phonological word types:

'S	/fay/	'empty'
	/law/	'sea'
'SS	/'palaw/	'house'
	/'wakah/	'medicine'
S'S	/ay-'tul/	'his foot'
	/re-'d'uh/	'cloudy'
SS'S	/yeh-aw-'faw/	'things which are burned'
	/mom-ni-'φan/	'you drop him down'
S'SS	/bu'tebi/	'fine, delicate'
	/a-'taba/	'he carries on his shoulder'
'SSS	/'regil-ni/	'he is angry'
	/'bosil-di/	'they are small'
SSS'S	/ar-fora-'weh/	'dragonfly'
	/mih-pay-al-'fil/	'you(pl) chatter'

SS'SS	/ay-tul-'wawih/	'toes'
	/ika'raman/	'just now'
S'SSS	/gu'tebi-ni/	'happy-animate'
	/ar-'kodih-ni/	'she is female'

5 MORPHOPHONEMICS

5.1 Vowel Coalescence

Since Kola does not allow geminate vowel clusters, geminate reduction occurs whenever a phonological process (such as compounding or reduplication) would result in geminate vowels. In addition to this geminate reduction, vowel coalescence also occurs when /a/ precedes a stressed /e/. In this case the sequence /a'e/ is realized as [e]. Examples are shown below:

/moha-'a/	'today'	-->	[mo'ha]
/fuh-mo-'ot/	'eleven'	-->	[fuh'mot]
/boka-'ekin/	'that canoe'	-->	[bo'kekin]

5.2 Consonant Coalescence

Consonant clusters in Kola occur only across syllable boundaries. However, there is a further restriction: Sequences of consonants with the same point of articulation can occur only when the second consonant is in a stressed syllable. Thus, words like /wil'tabih/ are acceptable, but words like */wanla'luan/ are not. When compounding, reduplication, or another morphological process results in a sequence of consonants which have the same point of articulation and do not "cross a stress boundary", this sequence will undergo a coalescence. In the first example below, reduplication to form the plural results in the sequence /nl/ which coalesces to become /n/. In the second example below, the juxtaposition of two morphemes results in the /lr/ sequence, which coalesces to become /r/.

/wan'luan/	'male'	-->	[wanla'luan]	-->	/wana'luan/	'males'
/mol ri	'ba/	-->	[mori'ba]			'Where are you going?'

5.3 Reduplication

Reduplication in Kola has a variety of functions. The most common functions include pluralization, intensification, nominalization, and other grammatical modification (into other word classes). Reduplication is also a very important factor in the interpretation of ambiguous phonological segments. Reduplication in Kola is specified by the following rules:

Reduplication Rules in Kola:

- (1) If the root form contains the sequence $V'C_1VC_2$ then the final consonant is reduplicated to form the sequence $VC_2'C_1VC_2$.
- (2) If Rule (1) does not apply, but the root form contains the sequence $(C_1)VC_2$ then the reduplicated form contains the phoneme /a/ plus the reduplicated final consonant to form the sequence $aC_2'(C_1)VC_2$. Note that the parentheses around C_1 indicate its presence is optional. In its

absence, C₂ becomes the onset of the stressed syllable, resulting in the reduplicated sequence a'C₂VC₂.

(3) If Rules (1) and (2) do not apply, then the initial C of the 'CV sequence in the root form is reduplicated with /a/ to form the sequence Ca'CV.

There are thus three distinctive sets of reduplicated words. In the first set, a consonant immediately follows the stressed vowel in the root form, but the initial syllable of the root form is not the stressed syllable, and it is preceded by an open syllable. Reduplication of these words follows the sequence in Rule (1). Examples of these words are shown below:

Open syllable precedes the stressed syllable -- via Rule (1).

<u>Root form</u>		<u>Reduplicated form</u>	
/tu'bay/	'new'	/tuy'bay/	'new'
/bu'lay/	'withered'	/buy'lay/	'withered'
/bu'tebi/	'gentle'	/bub'tebi/	'gentleness'
/bu'lebi/	'low'	/bub'lebi/	'humble'
/sa'mayah/	'good'	/say'mayah/	'good'

The second set of reduplicated words also has a consonant following the stressed vowel, however in these roots it is the case either that the stressed syllable is the initial syllable, or it is preceded by a closed syllable. Reduplication for these roots follows Rule (2), as shown below:

No syllable precedes the stressed syllable -- via Rule (2)

<u>Root form</u>		<u>Reduplicated form</u>	
/'nar/	'long'	/ar'nar/	'long'
/'tosi'	'short'	/as'tosi'	'short'
/'bosil/	'small'	/as'bosil/	'small'
/'eta/	'tall'	/a'teta/	'tall'
/'ariŋ/	'hot'	/a'rariŋ/	'hot'

Closed syllable precedes the stressed syllable -- via Rule (2).

<u>Root form</u>		<u>Reduplicated form</u>	
/af'ral/	'morning'	/afal'ral/	'early morning'
/ah'but/	'hard'	/ahat'but/	'hard'
/ab'luka/	'pressure'	/abak'luka/	'pressure'
/ah'tada/	'throw down'	/ahad'tada/	'throw down'

The third set consists of roots in which there is no consonant immediately following the stressed vowel. Examples of these roots and their reduplicated forms, in accordance with Rule (3), are shown below:

No syllable precedes the stressed syllable -- via Rule (3).

<u>Root form</u>		<u>Reduplicated form</u>	
/'pui/	'fruit'	/pa'pui/	'fruits'
/'rua/	'two'	/ra'rua/	'second'
/'rein/	'clever'	/ra'rein/	'cleverness'
/'luan/	'load'	/la'luan/	'loads'

Open syllable precedes the stressed syllable -- via Rule (3).

<u>Root form</u>		<u>Reduplicated form</u>	
/pa'nua/	'village'	/pana'nua/	'villages'
/ka'pua/	'kapok'	/kapa'pua/	'kapok'
/ta'kuan/	'deaf'	/taka'kuan/	'deaf'