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 (/b/ 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 Marlas (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 Marlas, has 16 consonants /t,k,b,d,g,z,f,s,h,m,n,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
<table>
<thead>
<tr>
<th>Consonants</th>
<th>Bilabial</th>
<th>Labio-Dental</th>
<th>Alveolar /Palatal</th>
<th>Velar /Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vl. Stops</td>
<td></td>
<td></td>
<td>t</td>
<td>k</td>
</tr>
<tr>
<td>Vd. Stops</td>
<td>b</td>
<td>d</td>
<td></td>
<td>g</td>
</tr>
<tr>
<td>Fricatives</td>
<td>f</td>
<td>s</td>
<td></td>
<td>h</td>
</tr>
<tr>
<td>Nasals</td>
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<tr>
<td>Lateral</td>
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<tr>
<td>Vibrant</td>
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<tr>
<td>Semivowels</td>
<td>w</td>
<td></td>
<td>y</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vowels</th>
<th>Front</th>
<th>Central</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td></td>
<td>u</td>
</tr>
<tr>
<td>Low</td>
<td>e</td>
<td>a</td>
<td>o</td>
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</tbody>
</table>

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, /ʃ/ and /f/, respectively. It is interesting that Indonesian loan words containing a voiceless bilabial stop are assimilated into Kola as /b/ rather than /ʃ/. For example Indonesian /kəpəl/ 'ship' becomes Kola [kabal] not *[kaʃal].

2.2 Description of Phonemes

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

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

/ʃ\unit/  ['ʃ\unit] 'thick'
/at\meta/  [a 'məta] 'eyes'
/ata\$on/  [a\$on] 'deaf'
/tak\h/  ['tak\h] 'ear'
/mata\g/  ['mata\g] 'my eye'

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

/ak/  [ak] 'I'
/ak\lak\h/  [ak\lak\h] 'broom'
/muk/  ['muk] 'banana'
/'nahak/  [nahak] 'year, old'
/'aka/  ['aka] 'for'
/'kolay/  ['kolay] 'black-soil land'
/'kanaka/  [ka\naka] 'do not'
/'lok\h/  ['lok\h] 'white'
[b] Voiceless bilabial stop; occurs immediately before a voiceless stop in a stressed syllable.

/b/ [ap'kobil] 'pressure'
/bub'tebi/ ['b̪u:p'te:bɪ] 'to slow'
/'bosil/ ['bɒsɪːl] 'small'
/'du'bam/ ['d̪u̯b̪am] 'seven'
/'gu'teih/ ['ɡ̱u̯tɛi̯h] 'fine, soft'
/'haba'beh/ ['hɑːba̯bɛh] 'red'

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

/d/ [ar'kodɨ] 'young woman'
/ad'idi/ ['aːd̪ɪdɪ] 'pain'
/'tudɨn/ ['tud̪ɪn] 'carry on one's head'
/'deskɨn/ ['deskɪːn] 'dry land'
/a'dom/ ['aːdɒm] 'he works'

/g/ [ar'kodɨ] 'young woman'
/ad'idi/ ['aːd̪ɪdɪ] 'pain'
/'tudɨn/ ['tud̪ɪn] 'carry on one's head'
/'deskɨn/ ['deskɪːn] 'dry land'
/a'dom/ ['aːdɒm] 'he works'

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

/g/ [ag'togɨ] 'straight'
/'gamah/ ['ɡamaħ] 'sky, heaven'
/mahah'gay/ ['maha̯ɡa̯], 'light'
/aga'wa/ ['ag̱a̯w̱a] 'he understands'


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

/s/ Voiceless grooved alveolar fricative.

/s/ [ki'so] 'I see'
/fanis/ ['faːnis] 'bat'
/sa'mayah/ ['saːmɑːj] 'good'
/'sual/ ['suːal] 'hold'
/as'tosi/ ['as'tɔsi] 'short'

/h/ [luha] 'oil'
/ha'tudɨ/ ['haːtudɪ] 'sago dish'
/hawɨh/ ['hawɨh] 'bright'
/\'bohi/ [\'boh\r] 'black'
/\ah\'dom/ [\ah\'dom] 'he works'

/\tol/ [\tol] 'rope'
/\muh\'lan/ [\muh\'lan] 'you speak'
/\l\ah/ [\l\ah] 'sail'
/\l\uan/ [\l\uan] 'load'
/\ab\il/ [\ab\il] 'inside'

/r/ [r] Voiced alveolar vibrant.
/\tor/ [\tor] 'chicken'
/\rihi/ [\rihi] 'thorn'
/\ru\i/ [\ru\i] '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'
/\m\u\a/ [\m\u\a] 'day\'me'
/\a\'num/ [\a\'num] 'he dives'
/\a\'ma/ [\a\'ma] 'he comes'

/n/ [n] Voiced alveolar nasal.
/\man/ [\man] 'bird'
/\u\i/ [\u\i] 'spit'
/\n\a\h\a/ [\n\a\h\a] 'year'
/\n\u\h/ [\n\u\h] 'coconut'
/\a\'nun/ [\a\'nun] 'wind'
/\a\'noka/ [\a\'noka] 'he says'

/u/ [u] Voiced velar nasal.
/\ku\'wa\qah/ [\ku\'wa\qah] 'I get up'
/\\u\qah/ [\\u\qah] 'lemon'
/\n\a\h\in/ [\n\a\h\in] 'name'
/\we\l\a/ [\we\l\a] 'my brother'
/\a\ma\q/ [\a\ma\q] 'my father'

/w/ [w] Voiced rounded labio-velar semivowel.
/\kuh\'naw/ [\kuh\'naw] 'I teach'
/\wil/ [\wil] 'head'
/\\weh/ [\\weh] 'water'
/\\wawa/ [\\wawa] 'small, child'
/\\wa\h\oh/ [\\wa\h\oh] '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\'jer] 'as, like'
/\wa\'yama/ [\wa\'yama] = [\wa\'jama] 'father'
/\ya\m\i/ [\ya\m\i] = [\ja\m\i] 'fast'
/\\yo\ba/ [\\yo\ba] = [\\jo\ba] 'enough'

[y] Voiced unrounded palatal nonsyllabic vocoid; occurs elsewhere.
<table>
<thead>
<tr>
<th>Word</th>
<th>音</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ay'biyan/</td>
<td>[ay'biyan]</td>
<td>'midwife'</td>
</tr>
<tr>
<td>/ba'hiyan/</td>
<td>[ba'hiyan]</td>
<td>'when'</td>
</tr>
<tr>
<td>/say'mayah/</td>
<td>[say'mayah]</td>
<td>'good'</td>
</tr>
<tr>
<td>/ha'biya/</td>
<td>[ha'biya]</td>
<td>'sago'</td>
</tr>
</tbody>
</table>

**Vowels:**

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

/ 'bohi/ | ['bohi:] | 'black' |
/ 'lokih/ | ['lokih] | 'white' |
/ 'wil'tabih/ | [w'il'tabih] | 'head' |
/ 'abil/ | ['abil] | 'inside' |

/i/  Voiced high close front unrounded vocoid, occurs elsewhere.

/ 'mil/ | ['mil] | 'go back' |
/ 'ni/ | [ni] | 'he' |
/ 'lih/ | ['lih] | 'throat, voice' |
/ 'ifa/ | ['ifa] | 'who' |
/ 'inaq/ | ['inaq] | 'my mother' |

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

/ 'kena/ | ['kena] | 'friend' |
/ 'ne/ | [ne] | 'it' |
/ 'e/ | [e] | 'that' |
/ 'eta/ | ['eta] | 'tall' |
/ 'ah'beh/ | [ah'beh] | 'red' |

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

/ 'kala/ | ['kala] | 'skin' |
/ 'man/ | [man] | '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/ | ['timuh] | 'east' |
/ 'ku'bana/ | [kʰ'bana] | 'I go' |
/ 'ha'tudu/ | [ha'tudu] | 'sago dish' |

/ i /  Voiced high close central unrounded vocoid; occurs elsewhere.

/ 'kukoq/ | ['kukoq] | 'myself' |
/ 'luhi/ | ['luhi] | 'clean' |
/ 'a'śun/ | [a'śun] | 'he kills' |
/ 'ay'tubih/ | [a'y'tubih] | 'calf' |
/ 'ur/ | [ur] | 'grass' |

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

/ 'kolay/ | ['kolay] | 'land' |
/ 'bom/ | [bom] | 'bamboo' |
/ 'fo/ | [fo] | 'dog' |
/ 'mona/ | [mona] | 'front' |
/ 'ata'şon/ | [a'ta'şon] | 'deaf' |
/ 'ot/ | [ot] | 'one' |
2.3 Statements of Contrast

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

/bu/* / [b'uy] 'betel palm'  
/gyu/* / [g'uy] - [g'uy] 'lost, gone'  
/fuy/* / [f'uy] 'enter'  
/muy/* / [m'uy] 'nail'

/ban/* / [ban] 'from'  
/man/* / [man] 'bird'  
/qa/* / [qa'] - [qa'] 'stone'  
/fat/* / [fat] 'contents'  
/wat/* / [wat] 'strait'

The labial consonants contrast intervocally as follows:

/a'ban/* / [a'ban] 'he goes'  
/a'gan/* / [a'gan] - [a'gan] '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'tó̂̄bal/* / [a'tó̂̄bal] - [a'tó̂̄bal] 'he washes clothes'  
/tafan/* / [ta'fan] 'not yet'  
/tama/* / [tama] 'meat'  
/a'tawa/* / [a'tawa] 'he marries'

The labial consonants contrast finally as follows:

/kom/* / [kom] 'I do'  
/ken'ko̠f/* / [ken'ko̠f] 'grip'  
/af'ka̠f/* / [af'ka̠f] 'butterfly'  
/a'la̠kaw/* / [a'la̠kaw] '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:

/togih/* / [tɔ'gi̠h] 'flat, level'  
/dodim/* / [dɔ'di̠m] 'dark'  
/sowi̠h/* / [sow̠i̠h] 'he dies'  
/loki̠h/* / [lok̠i̠h] 'white'  
/roqî/* / [roqî] 'burnt'  
/noham/* / [nɔ̠ham] 'chisel'  
/yowih/* / [yɔ̠wih] 'cold, cool'

The alveolar/palatal consonants contrast intervocally as follows:

/watay/* / [wa̠tay] 'turning'  
/wadal/* / [wa̠dal] 'pan, pot'  
/wasah/* / [wa̠sah] 'lie'  
/walah/* / [wa̠lah] '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'
The voiced alveolar stop /d/ never occurs word finally.

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

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

The velar/glottal consonants contrast intervocally as follows:

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

The velar/glottal consonants contrast finally as follows:

/’taq/ ['taq] 'not'
/’motak/ ['motak] '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/ ['mawah] 'on'
/’nahak/ ['nahak] 'year'
/’qaha/ ['qahan] 'my name'

The nasal consonants contrast intervocally as follows:

/’kama/ ['kama] 'we(excl)'
/’tama/ ['tama] 'meet'
/’ta’kana/ ['ta’kana] 'common, usual'
/’taq’a/ ['taq’a] 'not'

The nasal consonants contrast finally as follows:

/’ahum/ ['ahum] 'your grandfather'
/’yabun/ ['yabun'] - ['ząbun] 'sweat'
/’abuq/ ['abuq] 'my grandfather'

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

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

The vowels contrast intervocally as follows:

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

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The vowels contrast finally as follows:

/ˈbebi/ ['bebi:] 'flower'
/ˈhabaˈbe/ [ˈhabaˈbe] 'red'
/ˈdaba/ [ˈdaba] 'grains'
/ˈbabu/ [ˈbabu] 'grandpa'
/ˈboˈbo/ [ˈboˈbo] '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:

/ˈkasi/ ['kasi:] 'older sibling'
/ˈkasih/ ['kasih] 'scratch'
/ni/ [ni] 'he'
/nih/ [nih] 'spit'
/ʃu/ [ʃu] 'hair'
/ʃuh/ [ʃuh] 'arrow'
/tu/ [tu] 'again'
/tuh/ [tuh] 'string'
/we/ [we] 'mango'
/weh/ [weh] 'water'
/fe/ [fe] 'on, into'
/feh/ [feh] 'kangaroo'
/ˈwaka/ ['waka] 'mangrove'
/ˈwakah/ ['wakah] 'medicine'
/ma/ [ma] 'come'
/mah/ [mah] 'river'
/ko/ [ko] 'because'
/koh/ [koh] 'hit'
/ʃo/ [ʃo] - [ʃo] 'dog'
/ʃoh/ [ʃoh] - [ʃoh] '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.
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:

\[ /'\$uy/ \quad [\$uy] \quad 'lost, gone' \quad \rightarrow \quad /ay'\$uy/ \]
\[ /$ui/ \quad [\$uwr] \quad 'fruit' \quad \rightarrow \quad /a'\$ui/ \]

The ambiguous segments occur intervocally as well as word-finally. Intervocally, the sequences [iye], [iuy], [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.

\[ /'suwal/ \quad [\$uwal] \quad 'hold' \quad \rightarrow \quad /sa'sual/ \]
\[ /'yuwar/ \quad [\$yuwal] \quad 'sibling in law' \quad \rightarrow \quad /aw'yuwar/ \]
\[ /'biyaq/ \quad [\$biyaq] \quad 'midwife' \quad \rightarrow \quad /ay'biyaq/ \]

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:

\[ /'\$anen/ \quad 'a bird of paradise' \]
\[ /\$a'nis/ \quad 'bat' \]
\[ /'bobah/ \quad 'fear' \]
\[ /bo'bo/ \quad 'baby' \]
\[ /'aka/ \quad 'to, for' \]
\[ /a'ka/ \quad 'he eats' \quad (from /a/ 'he' + /'ka/ 'eat') \]
\[ /'talah/ \quad 'sit' \]
\[ /ta'lah/ \quad 'we sail' \quad (from /ta/ 'we' + /'lah/ 'sail') \]

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:

\[ /'nuh/ \quad 'coconut' \quad + \quad /'ekin/ \quad 'that' \quad \rightarrow \quad /nuhekin/ \quad 'that coconut' \]
\[ /'nen/ \quad 'that' \quad + \quad /'ika/ \quad 'fish' \quad \rightarrow \quad /nenika/ \quad 'that is fish' \]
\[ /\$a'dom/ \quad 'we work' \quad + \quad /'utan/ \quad 'field' \quad \rightarrow \quad /ta'domutan/ \quad 'we work the field' \]
\[ /'moha/ \quad 'day' \quad + \quad /'a/ \quad 'this' \quad \rightarrow \quad /mo'ha/ \quad 'today' \]

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:

/§o/  CV  'dog'
/a'ma/'  V.CV  'he comes'
/'ema/'  V.CV  'his father'
/'kauh/  CV.VC  'I cut'
/'sofi/  CV.CV  'wet'
/§a'nua/  CV.CV.V  'house'
/'lokih/  CV.CVC  'white'
/na'yer/  CV.CVC  'like, as'
/ha'ba'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.

<table>
<thead>
<tr>
<th></th>
<th>V</th>
<th>V.C</th>
<th>C.V</th>
<th>C.V.C</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<td>k</td>
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<td>x</td>
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</tr>
<tr>
<td>h</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>m</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>n</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>q</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
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.

C₂

<table>
<thead>
<tr>
<th>C1</th>
<th>C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>k</td>
</tr>
<tr>
<td>k</td>
<td>b</td>
</tr>
<tr>
<td>b</td>
<td>g</td>
</tr>
<tr>
<td>g</td>
<td>s</td>
</tr>
<tr>
<td>s</td>
<td>h</td>
</tr>
<tr>
<td>h</td>
<td>m</td>
</tr>
<tr>
<td>m</td>
<td>r</td>
</tr>
<tr>
<td>r</td>
<td>q</td>
</tr>
<tr>
<td>q</td>
<td>l</td>
</tr>
<tr>
<td>l</td>
<td>r</td>
</tr>
<tr>
<td>r</td>
<td>w</td>
</tr>
<tr>
<td>w</td>
<td>y</td>
</tr>
<tr>
<td>y</td>
<td>x</td>
</tr>
</tbody>
</table>

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'fuy/ 'I loose'
/ka'behil/ 'tongue'
/'falaw/ 'house'
/'fulan/ 'moon'
/'dodim/ 'dark'
/'dewar/ 'crab'
/'mas/ 'you plant'
/sihiqdana'liq/ '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 /-n/ occur syllabically in word-final position, as shown in the following examples:

/ˈreːn-ə/  'I am clever'
/ˈwam-ə/  'I am foolish'
/ˈagur-ə/  'He hits me'
/ˈwel-əm/  '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:

\[
\begin{array}{ccccccc}
V_2 & i & u & e & a & o \\
V_1 & x & x & x & x & x \\
\end{array}
\]

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

/ˈaɪui/  'fruits'
/ˈluaɪ/  'load'
/ˈraɪriŋ/  'clever'
/ˈauh/  '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  /ˈfay/  'empty'
/law/  'sea'
'SS  /ˈpəlaw/  'house'
/ˈwakəh/  'medicine'
S'S  /ˈaɪ-ˈtul/  'his foot'
/re-ˈdəh/  'cloudy'
SS'S  /ˈyeh-aw-ˈfaʊ/  'things which are burned'
/mom-ni-ˈtən/  'you drop him down'
S'SS  /ˈbuˈtebi/  'fine, delicate'
/a-ˈtaba/  'he carries on his shoulder'
'SSS  /ˈreɡil-ni/  'he is angry'
/ˈbosiл-di/  'they are small'
SSS'S  /ɑr-ˈforə-ˈweh/  'dragonfly'
/mi-h-pay-al-ˈfəl/  'you(pl) chatter'

43
SS'SS  /ay-tul-'wawih/  'toes'
      /ika'raman/  'just now'
S'SSS  /gu'tebi-ni/  'happy-animate'
      /ar-'kodihi-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:

/moh-'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'CVC₂ then the final consonant is reduplicated to form the sequence VC₂'C₁VC₁'

(2) If Rule (1) does not apply, but the root form contains the sequence '(C₁)VVC₂ then the reduplicated form contains the phoneme /a/ plus the reduplicated final consonant to form the sequence aC₂'(C₁)VVC₂. Note that the parentheses around C₁ indicate its presence is optional." In its
absence, \( C_2 \) becomes the onset of the stressed syllable, resulting in the reduplicated sequence \( a'C_2VC_2 \).

(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. Replication 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).

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tu'bay/</td>
<td>'new'</td>
</tr>
<tr>
<td>/bu'lay/</td>
<td>'withered'</td>
</tr>
<tr>
<td>/bu'tebi/</td>
<td>'gentle'</td>
</tr>
<tr>
<td>/bu'lebi/</td>
<td>'low'</td>
</tr>
<tr>
<td>/sa'mayah/</td>
<td>'good''</td>
</tr>
</tbody>
</table>

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. Replication for these roots follows Rule (2), as shown below:

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

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/'narin/'</td>
<td>'long'</td>
</tr>
<tr>
<td>/'tosi'</td>
<td>'short'</td>
</tr>
<tr>
<td>/'bosil/'</td>
<td>'small'</td>
</tr>
<tr>
<td>/'eta'</td>
<td>'tall'</td>
</tr>
<tr>
<td>/'ariq/'</td>
<td>'hot'</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/'af'r'al/</td>
<td>'morning'</td>
</tr>
<tr>
<td>/ah'but/</td>
<td>'hard'</td>
</tr>
<tr>
<td>/ab'luka/</td>
<td>'pressure'</td>
</tr>
<tr>
<td>/ah'tada/</td>
<td>'throw down'</td>
</tr>
</tbody>
</table>

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).

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/'pui/'</td>
<td>'fruit'</td>
</tr>
<tr>
<td>/'rua/'</td>
<td>'two'</td>
</tr>
<tr>
<td>/'rein/'</td>
<td>'clever'</td>
</tr>
<tr>
<td>/'luan/'</td>
<td>'load'</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/pa'nua/</td>
<td>'village'</td>
</tr>
<tr>
<td>/ka'pua/</td>
<td>'kapok'</td>
</tr>
<tr>
<td>/ta'kuan/</td>
<td>'deaf'</td>
</tr>
</tbody>
</table>
Closed syllable precedes the stressed syllable — via Rule (3) plus consonant coalescence rule.

<table>
<thead>
<tr>
<th>Root form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>/wan'luan/</td>
<td>'male'</td>
</tr>
<tr>
<td>/wana'luan/</td>
<td>'males'</td>
</tr>
</tbody>
</table>

As mentioned above, the reduplication patterns are useful in interpreting ambiguous sequences. For example, [suwal] 'hold' could be interpreted as /suval/ or /suwal/. If the latter form were assumed, then Rule (2) incorrectly predicts the reduplication form */aw'suwal/. If /suval/ is chosen, however, then via Rule (3) the correct reduplicated form /sa'suval/ is derived.

In the case of [yuwar] 'sibling in law', the correct reduplicated form is /aw'yuwar/, requiring that the root be phonologically represented as /yuwar/ and not */yuwar/. In a similar manner, other ambiguous sequences can be determined.

**APPENDIX A: Practical Orthography**

The following list shows the phonemes of Kola, and a suggested practical orthography.

<table>
<thead>
<tr>
<th>Phonemes</th>
<th>Variants</th>
<th>Orthography</th>
</tr>
</thead>
<tbody>
<tr>
<td>/t/</td>
<td>[t]</td>
<td>t</td>
</tr>
<tr>
<td>/k/</td>
<td>[k]</td>
<td>k</td>
</tr>
<tr>
<td>/b/</td>
<td>[b]</td>
<td>b</td>
</tr>
<tr>
<td>/d/</td>
<td>[d]</td>
<td>d</td>
</tr>
<tr>
<td>/g/</td>
<td>[g]</td>
<td>g</td>
</tr>
<tr>
<td>/j/</td>
<td>[j], [β]</td>
<td>p</td>
</tr>
<tr>
<td>/f/</td>
<td>[f]</td>
<td>f</td>
</tr>
<tr>
<td>/s/</td>
<td>[s]</td>
<td>s</td>
</tr>
<tr>
<td>/h/</td>
<td>[h]</td>
<td>h</td>
</tr>
<tr>
<td>/l/</td>
<td>[l]</td>
<td>l</td>
</tr>
<tr>
<td>/r/</td>
<td>[r]</td>
<td>r</td>
</tr>
<tr>
<td>/m/</td>
<td>[m]</td>
<td>m</td>
</tr>
<tr>
<td>/n/</td>
<td>[n]</td>
<td>n</td>
</tr>
<tr>
<td>/j/</td>
<td>[ο]</td>
<td>ng</td>
</tr>
<tr>
<td>/w/</td>
<td>[w]</td>
<td>w</td>
</tr>
<tr>
<td>/y/</td>
<td>[y], [ɔ]</td>
<td>y</td>
</tr>
<tr>
<td>/i/</td>
<td>[i], [r]</td>
<td>i</td>
</tr>
<tr>
<td>/e/</td>
<td>[e]</td>
<td>e</td>
</tr>
<tr>
<td>/a/</td>
<td>[a]</td>
<td>a</td>
</tr>
<tr>
<td>/o/</td>
<td>[ο]</td>
<td>o</td>
</tr>
<tr>
<td>/u/</td>
<td>[u], [υ]</td>
<td>u</td>
</tr>
</tbody>
</table>

**REFERENCES**

Collins, James  

Hughes, Jock  