1   OUTLINE OF PHONEMES

1.1   Consonants

	Pre-Alveolar	Alveolar	Post-Alveolar
voiceless		t	k
Stops			
voiced	b	d	g
Fricatives	f	s	h
Liquids	m	l	
Continuants	w	y	

There is contrast in point of articulation between voiceless stops at alveolar and post-alveolar positions; between voiced stops and voiceless fricatives at pre-alveolar, alveolar, and post-alveolar positions; and between liquids and continuants at pre-alveolar and alveolar positions.

There is contrast in manner of articulation in the pre-alveolar position between voiced stops, fricatives, liquids and continuants; in the alveolar position between voiced and voiceless stops, fricatives, liquids, and continuants; and in the post-alveolar position between voiced and voiceless stops and fricatives.

1.2   Vowels

	Front	Back
High	i	u
Mid	e	o
Low	a	ɔ

The oral vowels have contrast between high, mid, and low front
and back tongue positions; and between front high, mid, and low
positions; and back high, mid, and low positions. All oral vowels
contrast with nasalized counterparts..

1.3 Supra-segmental Phonemes

There is contrast between oral and nasal vowels in all vowel
positions. Nasalization is indicated by /ṿ/.

Stress is contrastive and is marked by /'/ preceding the stressed
syllable.

2 DESCRIPTION OF PHONEMES

2.1 Consonants

2.1.1 Phonetic Work Chart

	Bilabial	Labio-Dental	Alveolar	Alveo-Palatal	Velar	Glottal
Stops vl.			t		k	
Stops vd.	b		d		g	
Fricatives		f	š s			h
Nasals	m		n			
Laterals			l			
Continuants	w			y		

2.1.2   Phonetic description of the phonemes and distribution of the
         allophones

Phoneme	Allophone	Description and Distribution
/b/	[b]	Voiced bilabial stop. Occurs word initial and medial. ['bibi] /'bibi/ 'things' ['ibulu] /'ibulu/ 'knee' [sɔ'yabe] /sɔ'yabe/ 'death adder'
/t/	[t]	Voiceless alveolar stop. Occurs word initial and medial. ['tali] /'tali/ 'bow' [bɔ'tɔlɔ] /bɔ'tɔlɔ/ 'bottle' ['kɔti][2] /'kɔti/ 'cotton thread' See p. 104 regarding the ⁿ neutralization of voiceless stops.
/d/	[d]	Voiced alveolar stop. Occurs word initial and medial. ['dibi] /'dibi/ 'leaf' [gɔ'dɔme] /gɔ'dɔme/ 'frog (type)' [fɔ'da] /fɔ'da/ 'to climb'
/k/	[k]	Voiceless velar stop. Occurs word initial and medial. ['kida] /'kida/ 'mat' ['wɔkusayɔ] /'wɔkusayɔ/ 'rat (type)' [tɔ'waka] /tɔ'waka/ 'shoes'
/g/	[g]	Voiced velar stop. Occurs word initial and medial. ['guli] /'guli/ 'comb' [i'gewɔ] /i'gewɔ/ 'sago (type)' [ti'gai] /ti'gai/ 'weed (type)'

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Phoneme	Allophone	Description and Distribution
/f/	[f]	Voiceless labio-dental fricative. Occurs word initial and medial. ['fi s̠i] /'fisi/ 'kindling' [fo'famạ] /fo'famạ/ 'platform' ['sɔfo] /'sɔfo/ 'dog'
/s̠/	[s̠]	Voiceless fronted alveolar fricative. Occurs word initial and medial only before high vowels. ['s̠igɔ] /'sigɔ/ 'bird (generic)' [ɔ's̠ulɔ] /ɔ'sulɔ/ 'tree (type)' ['das̠i] /'dasi/ 'taro (type)'
/s/	[s]	Voiceless alveolar fricative. Occurs word initial and medial before mid and low vowels. ['semẹ] /'semẹ/ 'fish (type)' [dɔ'sɔbu] /dɔ'sɔbu/ 'ash' ["yɔmɔ̧'sạ]³ /"yɔmɔ̧'sa/ 'by himself'
/h/	[h]	Voiceless glottal fricative. Occurs word initial and medial. ['hobe] /'hobe/ 'lung' [sa'halɔ] /sa'halɔ/ 'bird (type)' ['dihɔi] /'dihɔi/ 'bush knife'
/m/	[m]	Voiced bilabial nasal. Occurs word initial and medial. ['mi s̠i] /'misi/ 'tree (type)' ["sɔmɔ̧'ge] /"sɔmɔ̧'ge/ 'turtle' [sɔ'mạ] /sɔ'mạ/ 'snake (type)'

Phoneme	Allophone	Description and Distribution
/l/	[n]	Voiced alveolar nasal. Occurs word initial and morpheme medial when surrounded by nasalized vocoids. Is in free fluctuation with [l] word medially across morpheme boundaries when preceded or followed by a nasal vocoid.

['nę] /'lę/   '2nd sing. poss.'
['nąwi] /'ląwi/   'wallaby'
['nǫnį] /'lǫlį/   'namesake'
['mįnį] /'mįlį/   'nose'
['bǫnǫ] /'bǫlǫ/   'fat'
['mą-na] ∼ ['mą-la] /'mala/ 'to put'
['i-nįyǫ] ∼ ['i-lįyǫ] /'ilįyǫ/ going'
['fę-ne] ∼ ['fę-le] /'fele/ 'at the edge"

| | [l] | Voiced alveolar lateral. Occurs word medial in the environment of oral vocoids or only one nasal vocoid. |

['ala] /'ala/   '1st dual'
['uli] /'uli/   'hole in ground'
['bɔlɔ] /'bɔlɔ/   'and'
['mala] /'mala/   'younger sibling'
['milɔ] /'milɔ/   'roof cap'

| /w/ | [w] | Voiced bilabial continuant. Occurs word initial and medial. |

['wase] /'wase/   'tree (type)'
['koawe] /'koawe/   'rat (type)'
[ki'wɔ] /ki'wɔ/   'tree (type)'

Phoneme	Allophone	Description and Distribution
/y/	[y]	Voiced alveo-palatal continuant.
		Occurs word initial and medial.
		['yo] /'yo/ 'sago bag'
		['ayɔ] /'ayɔ/ 'authority person'
		[kɔ'yabi] /kɔ'yabi/ 'cassowary'

2.1.3 Contrastive sets of consonant phonemes

There are three emic points of articulation in Samo, bilabial (pre-alveolar), alveolar, and velar (post-alveolar). The stops /b,t,d,k,g/ can be divided into two subsets based upon the presence or absence of voicing. Stops contrast word initially and word medially.

Initial		Medial	
/'babɔ/	'mother's brother'	/'bibi/	'things'
/'tabɔ/	'extracted'	/'huti/	'name'
/'dabɔ/	'dug'	/'kudi/	'inside'
/'kabɔ/	'cut (past)'	/'fiki/	'pick axe'
/'gabɔ/	'gathered'	/'gigi/	'stone club'

All fricatives /f, s, h/ are voiceless and contrast word initially and word medially.

Initial		Medial	
/'fabɔ/	'bore fruit'	/'dɔfai/	'intelligent'
/'sabɔ/	'put into'	/"sɔbɔ'sai/	'old woman'
/'habɔ/	'cut down'	/da'hai/	'smoke'

Liquids /m, l/ contrast word initially and medially.

Initial		Medial	
/'mabɔ/	'put down'	/'umi/	'flat'
/'labɔ/	'ate'	/'uli/	'hole in ground'

The continuants /w, y/ contrast initially and medially.

Initial		Medial	
/'wase/	'tree (type)'	/'dawɔ/	'sago (type)
/'yase/	'stone (type)'	/'tayɔ/	'shadow/reflection'

The pre-alveolar consonants /b, f, m, w/ all contrast word initially and medially.

Initial		Medial	
/'bɔge/	'pearl shell'	/sɔ'yabe/	'death adder'
/'fɔsi/	'poison root'	/'hafe/	'tree (type)'
/'mɔbu/	'sago (type)'	/'wame/	'tree (type)'
/'wɔli/	'large lizard'	/tɔ'we/	'fish (type)'

The alveolar consonants /t, d, s, l, y/ all contrast word initially and medially.

Initial		Medial	
/'tele/	'flea'	/"howɔ'to/	'work'
/'dele/	'under-brush'	/'edo/	'tree (type)'
/'sela/	'to sew'	/'oso/	'man'
/le'la/	'to give'	/'ilo/	'2nd dual focus'
/'ye/	'3rd sing. subj.'	/'ayo/	'blood'

The post-alveolar consonants /k, g, h/ all contrast word initially and medially.

Initial		Medial	
/'kisi/	'weeds (generic)'	/tɔ'waka/	'shoes'
/gi'sai/	'adolescent'	/"daga'li/	'chest bands'
/'hisi/	'bird (type)'	/sa'halɔ/	'bird (type)'

2.1.4 Neutralization of word medial voiceless stops

Voiceless medial stops are infrequent in Samo. No bilabial voiceless stop exists and across morpheme boundaries free fluctuation between voicing and voicelessness occurs.

(i-'di-la) ∼ (i-'ti-la)   'cause to go/send'
('bili-'gibi) ∼ ('bili-'kibiʃ   'chest'
('debe-'gigʒ) ∼ ('debe-'kigʒ)   'finger nail'

When a word beginning with an initial voiceless stop combines
with another word to form a new word, the voiceless stop sometimes
becomes voiced if placed medially.

/'tɔwɔ/   'animal fur'
/o'dɔwɔ/   'human hair'

In this case, the initial /o/ is probably derived from /'oso/
'man'. In a neighboring dialect /'o/ is the word for 'man'. /o'dɔwɔ/
then, is a compound word and the result is much the same as across
morpheme boundaries above. In this case, however, voicing has
completely replaced voicelessness, possibly showing a direction of
phonetic change in the language. Therefore in Samo, voiceless stops
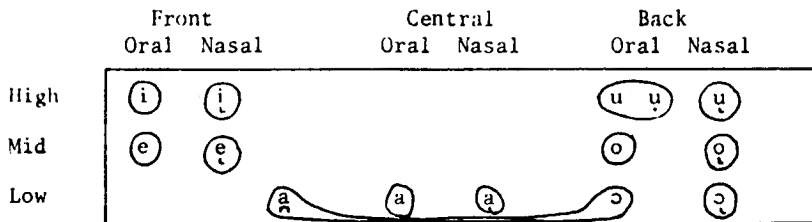occur primarily across morpheme boundaries or in borrowed words.

/bɔ'tɔlɔ/   'bottle'
/"fiki'sa/   'picture/camera'
/ta'laka/   'truck/car'

The near absence of medial voiceless stops in Samo, and their
neutralization with voiced stops when they do occur, reflects the
dialect variation on the Strickland Plain. The lack of a bilabial
voiceless stop places Samo centrally between the dialect to the south
which has no voiceless stops, and the dialect to the northeast which
has /p, t, k/ as counter-parts to the voiced stops at the same points
of articulation.

2.2 Vowels

2.2.1 Phonetic work chart

	Front		Central		Back	
	Oral	Nasal	Oral	Nasal	Oral	Nasal
High	i	i̧			u u̧	u̧
Mid	e	ȩ			o	o̧
Low		a̧	a	a̧	ɔ	ɔ̧

2.2.2 Phonetic description of the phonemes and distribution of
       allophones

Phoneme	Allophone	Description and Distribution
/i/	[i]	High close front unrounded vocoid. Occurs word initial, medial, and final. ['iŋu] /'isu/ 'hard wind' ["ɔsi'ga] /"ɔsi'ga/ 'a point' ['dɔfi] /'dɔfi/ 'hot'
/e/	[e]	Mid close front unrounded vocoid. Occurs word initial, medial and final. ['esɔ] /'esɔ/ 'string bag' [de'gelɔ] /de'gelɔ/ 'together' ['hebe] /'hebe/ 'later'
/a/	[a]	Low open central unrounded vocoid. Occurs word initial, medial and final. ['ala] /'ala/ '1st. dual' [kɔ'lage] /kɔ'lage/ 'banana (type)' [ge'sa] /ge'sa/ 'tree (type)'

Phoneme   Allophone   Description and Distribution

/u/   [ṳ]   High close rounded retroflexed vocoid. Occurs
                      word initial and medial as the first element
                      of a complex vocoid sequence with stress on
                      the second element of the syllable nucleus.
                      ['ṳ͡o]⁴   /'uo/   'Strickland River'
                      ['kṳ͡i]   /'kui/ 'adolescent male'
                      [ɔ'ṳ͡abɔ] /ɔ'uabɔ/ 'butterfly'
                      ['bṳ͡ɔ]   /'buɔ/ 'sit'

          [u]   High close rounded vocoid. Occurs word initial,
                      medial and final.
                      ['ugɔ]   /'ugɔ/   'tree (type)'
                      ['busi] /'busi/ 'pitpit (type)'
                      [tɔ'bu] /tɔ'bu/ 'bird (type)'

/o/   [o]   Mid close back rounded vocoid. Occurs word
                      initial, medial and final.
                      ['osʊ]   /'oso/   'man'
                      [so'mɔ̥] /so'mɔ/ 'rat (type)'
                      ['tugo] /'tugo/ 'banana (type)'

/ɔ/   [a̰]   Low open central slightly fronted unrounded
                      vocoid. Occurs only morpheme final, word
                      medial in an unstressed syllable which becomes
                      stressed due to the addition of an unstressed
                      suffix or clitic.
                      ['nabɔ̥ + ba] → [na̰'ba̰ba] /la'bɔba/ 'did you
                                                                    eat?'

                      ['bɔyɔ + mɔ̥] → [bɔ'ya̰mɔ̥] /bɔ'yɔmɔ/ 'to the pig'
                      ['sɔbɔ + be] → [sɔ'ba̰be] /sɔ'bɔbe/ 'the woman's'

Phoneme Allophone Description and Distribution

　　　　　　[ɔ]　　　Low close back rounded vocoid. Occurs word
　　　　　　　　　　　initial, medial and final.

　　　　　　　　　　　['ɔli]　/'ɔli/　'tomorrow/yesterday'

　　　　　　　　　　　['dɔfi]　·/'dɔfi/　'hot'

　　　　　　　　　　　['kiwɔ]　/'kiwɔ/　'tree (type)'

2.2.3 Contrastive sets of oral vowel phonemes

　　The six oral vowel phonemes in Samo are differentiated as to
front and back and high, mid, and low tongue positions. They
contrast word initially, medially, and finally.

Initial		Medial		Final	
/'ili/	'3rd dual obj.'	/'tibɔ/	'marked'	/'mi̯si/	'tree (type)'
/e'labɔ/	'banana (type)'	/'teba/	'lumber'	/'mȩse/	'thigh'
/'ali/	'path/road'	/'tabɔ/	'extracted'	/ge'sa/	'tree (type)'
/'uli/	'hole in ground'	/'tubɔ/	'went up-stream'	/'kisu/	'tree (type)'
/'olɔ/	'tree sap'	/'tobɔ/	'took'	/'goso/	'rat (generic)'
/'ɔli/	'yesterday/ tomorrow'	/'tɔbɔ/	'died'	/bɔ'sɔ/	'beer trough'

2.2.4 Neutralization of vowels in an unstressed, word medial
　　　　position

　　In unstressed syllables, word medially, vowels tend to
neutralize to a central mid vocoid [ʌ].

　　　　["ubʌ'gi]　/"ubi'gi/　　'buttocks'

　　　　["bɔbʌ'se]　/'bɔbe 'se/　'sand'

　　　　[sʌ'halɔ]　/sa'halɔ/　'bird (type)'

　　　　["tulʌ'gai]　/"tulu'gai/　'bird (type)'

　　　　[a"lafʌ'kibi]　/a"lafo'kibi/　'wing'

　　　　["fɔfʌ'gia]　/"fɔfɔ'gia/　'pumpkin'

However, the degree of neutralization varies between speakers,
and when said slowly the true phonetic quality becomes apparent.
Therefore, only the true phonetic quality has been written in all
words included in this paper.

2.3 Supra-segmental phonemes

2.3.1 Nasalization

There are nasal counterparts for all the oral vowel phonemes.

/i/ contrasts with /į/

['ili]   /'ili/   '3rd. dual obj.'

['įnɔ]   /'įlɔ/   'bird (type)'

["ɔbi'sįtę] /"ɔbi'sitę/   'red'

[buˈsįtę]   /bu'sįtę/   'black'

['dɔfi]   /'dɔfi/   'hot'

["ɔni'fį]   /"ɔlį'fi/   'bile'

/e/ contrasts with /ę/

[e'do]   /e'do/   'tree (type)'

[ę'da]   /ę'da/   'to shoot'

[ke'da]   /ke'da/   'to lie down'

[kę'na]   /kę'la/   'to scrape'

['bɔge]   /'bɔge/   'pearl shell'

[ko'gę]   /ko'gę/   'taro (type)'

/a/ contrasts with /a̧/

['ala]   /'ala/   'harvest taro'

['a̧na]   /'a̧la/   'pull weeds'

['sabɔ]   /'sabɔ/   'put into'

['sa̧bo]   /'sa̧bo/   'ginger'

['koya]   /'koya/   'from there'

["ɔbę'ya̧] /"ɔbę'ya̧/ 'nose piece'

/u/   contrasts with /ṳ/
    ['uli]   /'uli/   'hole in ground'
    ['ṳnḭ]   /'ṳlḭ/   'bird (type)'
    ['hula]   /'hula/   'to clear ground'
    ['hṳla]   /'hṳla/   'to marry'
    ['gɔgu]   /'gɔgu/   'brace of arm band'
    [kɔ̰'gṳ]   /kɔ̰'gṳ/   'fern (type)'

/o/   contrasts with /o̰/
    ['ogo]   /'ogo/   'betel nut mixture'
    ['o̰go̰]   /'o̰go̰/   'stone club'
    ["fofo'de]   /"fofo'de/   'fast'
    [o̰'fo̰na]   /o̰'fo̰la/   'to sew'
    ['ho]   /'ho/   'thumb'
    ['ho̰]   /'ho̰/   'water'

/ɔ/   contrasts with /ɔ̰/
    ['ɔ]   /'ɔ/   'burned resin'
    ['ɔ̰]   /'ɔ̰/   'yes'
    ['ɔyɔ]   /'ɔyɔ/   'native beer'
    ['ɔ̰yɔ̰]   /'ɔ̰yɔ̰/   'older brother'
    ['gɔgɔ   /'gɔgɔ/   'fish scales'
    ['gɔ̰gɔ̰]   /'gɔ̰gɔ̰/   'cowrie shells'

2.3.2 Stress

     Stress is composed of a slightly longer syllable nucleus,
somewhat higher pitch, and a greater intensity. Stress operates at
all phonetic levels of the language. Phrase, sentence, paragraph, and
discourse stress patterns exist in Samo and are largely dependent upon
the type of information contained in them. Statements vary from
questions, conversation from narrative, command from explanation,
sympathy from anger, and so on. However, we have not analyzed the
higher phonological levels sufficiently to include a detailed
description here.

     The length of time taken to say a word of three or more syllables
approximates that taken for two syllable words. Thus the longer the
word, the faster the speed with which each syllable is spoken. This
has the effect of making each stressed syllable slightly more lenis
than the previous stressed syllable.

2.3.2.1 Syllable stress

     At the syllable level, there is stress variation within the
syllable nucleus. In syllables with complex vocoid sequences, the
stress may be on either the first or second element of the sequence
(c.f. p. 115).

     ['wɔ͡i]   'old'
     ['wɔ͡i]   'tree (type)'
     [kɔ'ga͡u]   'garden'
     [kɔ'ga͡u]   'tree (type)'
     ['ku͡edɔ]   'tired'

     These syllables containing complex vocoid sequences may, however,
be stressed or unstressed in the context of a word.

     ['u͡ɔu͡ɔ/   'bird (type)'
     ['hɔua/   'taro (generic)'
     [hɔ'gai/   'bush spirit'

2.3.2.2. Word Stress

Stress is contrastive, falling on either the first or second
syllable and other syllables following in words of three syllables or
more. Primary stress is on the first stressed syllable of the word
and secondary stress occurs on alternate following syllables.

/'ɔli/   'yesterday/tomorrow'
/ɔ'li/   '2nd dual obj.'
/'hɔmɔ̜/   'foot'
/hɔ'mɔ̜/   'banana (type)'
/'sɔfo/   'dog'
/sɔ'fo/   'soap'
/'tạmị/   'time/clock'
/tạ'mị/   'arrow (type)'
/"ubi'gi/   'buttocks'
/e'bɔbo/   'tree (type)'
/"uli'gibi/ 'head'
/ɔ̜"sali'yɔ̜/ 'snake (type)'

2.3.2.3 Stress Perturbation Due to Affixation

Each Samo stem and affix has its own stress pattern. These
patterns are quite evident on non-verbal stems (see above) but are
more difficult to determine for verbs. The minimal form of the verb
is the imperative form. Thus, in multi-syllabic verb stems the basic
stress pattern is evident in the imperative form.

/sɔ'gɔ/   'plant!'
/hu'ga/   'come!'
/"fifi'gi/   'shake!'
/ge'lɔfo/   'cut!'
/kɔ'gabo/   'sweep!'

In the case of mono-syllabic stems a difficulty arises. Because
it is impossible to utter a mono-syllable word without some stress,
in the imperative form all mono-syllabic verbs are stressed. However,
when combined with stressed affixes the original stem stress becomes
apparent since identical environments, except for stress, exist. When
a stressed stem plus stressed affix co-occur, a double stress pattern
exists and both the stem and the affix receive equal stress. When an
unstressed stem plus a stressed affix co-occur, the unstressed nature
of the stem becomes apparent by the unstressed-stressed pattern of the
resulting word.

    /'ga + 'la/ → /'ga'la/   'to gather food'
    /ga + 'la/ → /ga'la/   'to process sago'
    /'ha + 'la/ → /'ha'la/   'to smoke/dry meat'
    /ha + 'la/ → /ha'la/   'to chop trees'
    /'la̧ + 'la/ → /'la̧'la/   'to eat'
    /lȩ + 'la/ → /lȩ'la/   'to give'

The addition of obligatorily stressed or unstressed affixes may
perturb the stress pattern of previous affixes, or the stem, in order
to conform to the basic alternate stress pattern of the language.
Samo does not accept contiguous unstressed syllables, but two stressed
syllables may co-occur if perturbation is impossible, as in the case
of mono-syllabic stressed stem plus stressed affix.

    ['ade]   +   [mɔ̧]   →   /a'demɔ̧/   'to father'
    father   to

    ['mɔ̧sɔ̧] +   [mȩ]   →   /mɔ̧'somȩ/   'at the house'
    house   at

    ['sɔbɔ] +   [bȩ]   →   /sɔ'bɔbȩ/   'belongs to the woman'
    woman   poss.

    ['i] + [bɔ̧] + [ba] → /i'bɔba/   'did (he) go?'
    go   past   interrog.

    [sɔ'gɔ] + ['la]   →   /'sɔgɔ'la/   'to plant'
    plant   inf.

    ['ha]   ['la]   →   /'ha'la/   'to dry meat'
    dry   inf.

On verbal stems, the addition of the unstressed affix '-bɔ' (past), causes an unstressed verb stem to become stressed, thereby neutralizing the contrast between minimal pairs which is apparent when the affix '-la' (infinitive) is added.

[ga] +	['la]	→	/ga'la/	'to process sago'
process	inf.			
sago				

[ga] +	[bɔ]	→	/'gabɔ/	'processed sago'
process	past			
sago				

['ga] +	['la]	→	/'ga'la/	'to gather food'
gather	inf			
food				

['ga] +	[bɔ]	→	/'gabɔ/	'gathered food'
gather	past			
food				

The addition of more affixes can perturb an unperturbed form, but cannot further perturb an already perturbed form. If further affixation causes two unstressed syllables to come together at the end of a previously perturbed form, the affix will itself perturb to conform to the alternate stress pattern of the language. However, Samo rarely has more than 2 affixes on a particular morpheme. The following two verbs exemplify these rules for stress perturbation:

| ['la] + | [lɔ] | → | /'lalɔ/ | 'eat and' |
| eat | coor. | | | |

(A stressed stem plus unstressed affix gives a stressed-unstressed pattern)

| [le] + | [lɔ] | → | /'lelɔ/ | 'give and' |

(An unstressed stem plus an unstressed affix causes the stem to become stressed, resulting in a stressed - unstressed pattern)

| ['lalɔ] + | [dɔ'ba] | → | /'laˈˈlɔdɔ'ba/ | 'having eaten' |
| eat-coor. | participle | | | |

(The addition of a two syllable affix with an unstressed-stressed pattern causes a preceding unstressed syllable to become stressed.)

| ['lelɔ] + | [dɔ'ba] | | /"lelɔ'dɔba/ | 'having given' |
| give-coor. | participle | | | |

(The addition of a two syllable affix with unstressed-stressed pattern should cause the previous unstressed syllable to become stressed. However, since the stress has already been perturbed once, it does not further perturb. Instead, the added affix adjusts its own stress pattern to conform to the overall general pattern of alternate syllable stress within the word.)

Stress, then, is contrastive at the word level and its placement within the word may vary with the addition of affixes,both on verbs and non-verbs. Primary stress occurs on the first stressed syllable of a word except in forms which have undergone stress perturbation. In these forms it is the syllable which has received the perturbed stress which manifests primary stress e.g. 'la-"lɔ-dɔ'ba; "le-lɔ- 'dɔba. This perturbation of stress is made most obvious in words which have a final unstressed /ɔ/ to which an unstressed affix is added since the [ą] allophone only occurs in syllables which receive perturbed stress.

['laꞌꞌlądɔ'ba]   /'laꞌꞌlɔdɔ'ba/   'having eaten'

[sɔ'bąbe]   /sɔ'bɔbe/   'the woman's'

See allophonic destribution statement (p. 107) for further examples.

3. INTERPRETATION

3.1 The status of items which may be either consonant or vowel

There are two semi-vowels (continuants) /w/ and /y/ which may be interpreted either as voiced pre-alveolar continuant and voiced alveolar continuant, or as high back vowel and high front vowel, respectively.

In this section we describe the ramifications of interpreting these sounds as continuants. Such an interpretation is closely tied to the problem of complex vowel sequences and syllable division of words.

Initially we wish to establish the fact that /w/ and /y/ do, in
fact, exist as continuants in the language. As proof we offer the
following:

- ['ye̪]   /'ye̪/   '3rd. sing. subj.'
- [sa̪'yi̪] /sa̪'yi̪/ 'withered'
- ['uyɔ]   /'uyɔ/   'mother'
- [ɔ'yu]   /ɔ'yu/   'tree (type)'
- ['wɔli] /'wɔli/ 'tree (type)'
- ['na̪wi] /'la̪wi/ 'wallaby'
- [ki'wɔ] /ki'wɔ/ 'tree (type)'
- ['dawɔ] /'dawɔ/ 'sago (type)'

The sounds in question do not appear in a transitional position in
these words and therefore could not be interpreted as vocoids in vowel
sequences. In these instances they must be given full phonemic status
as /w/ and /y/.

3.2 Syllables containing complex vowel sequences

Samo contains many complex vowel combinations which can be analysed
as two types of vowel sequences. One type is a combination of vowels
which form a close knit sequence (glide) which may be either rising or
falling. The other is a complex combination of vowels with nuclear
stress always on the second element. This nuclear stress, in turn,
strongly affects the phonetic quality of the first element in the
sequence.

3.2.1 Close knit sequences of vowels

There are six close knit sequences of vowels (glides) which may
occur within a syllable; ai, ae[5], au, ɔi, ɔe[5], and ɔu. Within the
context of words these act as a complex syllable nucleus which may be
falling (↖ nuclear stress on the first element) or rising (↗ nuclear
stress on the second element). Rhythmically, these act as a unit of
sound much as the single vowel phonemes (Pike 1947:236) and on the
oscilloscope receive the same timing.

[tu'ba̯i]	/tu'ɓai/	'stone scraper'
['ha̯i]	/'hai/	'under'
['kae̯]	/'kae/	'digging stick'
[kɔ'la̯u]	/kɔ'lau/	'tree (type)'
['ka̯u]	/'kau/	'big'
['hɔi]	/'hɔi/	'stone axe'
['ɓɔ̯i]	/'ɓɔi/	'snake (generic)'
['tɔe̯]	/'tɔe/	'slope'
['kɔ̯u]	/'kɔu/	'woman's string skirt'

These vocoid sequences could be interpreted as vocoid plus /y/ or
vocoid plus /w/, i.e. [tu'bay] 'stone scraper', and [kɔ'law] 'tree
(type)' respectively. However, there are no other closed syllables in
the language and no word medial consonant clusters, i.e. [kay'bɔ]
'fish (type)'. Therefore we prefer to interpret these as close knit
vocoid sequences, thereby conforming to the most usual CV pattern in
the language.

Most of these sequences also have nasalized counterparts.

[mã'ha̯ĩ]	/mã'hãĩ/	'bandicoot'
[mɔ̃'ga̯ũ]	/mɔ̃'gãũ/	'wart'
[nɔ̃'gɔ̯ĩ]	/lɔ̃'gɔ̃ĩ/	'mud'
['sɔe̯]	/'sɔ̃ẽ/	'betelnut'
['tɔ̯ũ]	/'tɔ̃ũ/	'stick'

3.2.2 Complex sequences of vowels

The second and more complex kind of vowel sequence may be divided
into three sub-types, all of which have nuclear stress on the second
element: (1) involves the retroflexed allophone of /u/, (2) involves
a combination of /o/ with other vowels to form a sound similar to
labialization of the preceding consonant, and (3) involves the
combination of /i/ with other vowels to form a sound similar to
palatalization of the preceding consonant. In these combinations both
speakers and the oscilloscope indicate the timing as identical with

that of a single syllable.

3.2.2.1 Sequences involving /u/

In the first sub-type of complex vowel sequences [u] combines with the following vowel to form a complex sequence of sound with stress on the second element. In cases where a vowel precedes the sequence it has its own vowel quality separate from the complex sequence.

['bu̯i]	/'bui/	'rotten wood'
['ku̯edɔ]	/'kuedɔ/	'tired'
['u̯ala]	/'uala/	'to whoop'
['u̯ɔna]	/'uɔla/	'to be amazed'
[ɔ'u̯ɔ]	/ɔ'uɔ/	'betrothed'

In these sequences there is no transitional sound as from a high back vowel to other vowels, so transitional /w/ could not be placed between them. In fact, there is contrast at that point between /u/ and /w/. Not only is there contrast between phonemes, but the timing is contrastive as well, resulting in multi-syllable sequences as compared with single syllable sequences.

/ɔ'uɔ/	'bethrothed'
/'ɔwɔ/	'older sister'
/'buɔ/	'sit!'
/'suwɔ/	'men's grass skirt'

3.2.2.2 Sequences involving a combination of /o/ with other vowels

In the second sub-type, vowel combinations with /o/ as the first unstressed element occur only following consonants and result in the preceding consonant having a labialized quality in rapid speech.

['dõạfi]	/'doafi/	'new'
['hõ̧ahõ̧a]	/'hoahoa/	'mango'
['kõ̧a]	/'koa̧/	'bone dagger'
['gõ̧ọdɔ]	/'goɔdɔ/	'as big as'
['hõ̧ọde]	/'hoọde/	'old man'
[kɔ'gõ̧ai]	/kɔ'goai/	'pregnant'

In all these sequences, the vowels combine to form a single complex
syllable with the nuclear stress always on the second element. When
speakers say these words slowly, the true phonetic quality of the
/o/ becomes apparent. The /o/ in each case acts almost as a
transitional vowel with very short timing. Because nuclear stress is
on the second element, and there is some transitional sound between
the two vowels, the resulting vocal sequence gives the preceding
consonant a labialized quality in rapid speech. Such vowel sequences
may never occur in syllable initial position but always in combination
with a preceding consonant. /o/ may further combine with a close
knit sequence to form a doubly complex vowel sequence. Thus it is
possible in the language to have a non-suspect sequence of three
vowels within a single syllable.

['koaimɔ̧]	/'koaimɔ/	'plenty'
[kɔ'goai]	/kɔ'goai/	'pregnant'

/o/ never occurs in combination with vowels except in the environments
described above.

3.2.2.3 Sequences involving a combination of /i/ with other vowels

A similar phenomenon exists in the third sub-type of complex
vowel sequences where /i/ combines with another vowel or vowel
sequence. In this environment /i/ acts as a transitional vowel
following a consonant and because some transitional sound occurs
between the vowels a complex sound similar to palatalization results.

['biete]	/'biete/	'yellow'
[he'gia]	/he'gia/	'only'
['diu]	/'diu/	'canoe'
['dio]	/'dio/	'woman's sister-in-law'
['hiɔwɔ]	/'hiɔwɔ/	'eye'
["olo'kiai]	/"olo'kiai/	'bald'

These sequences are in contrast to other sequences of the same vowel
combinations which are said with multi-syllable timing and have emic
transitional sound.

['ie]	/'iye/	'go'
[hi'ani]	/hi'yali/	'pitpit/year'
['dio]	/'diyo/	'heart of a tree'
['hiɔ]	/'hiyɔ/	'wild'

   We must, therefore, note the importance of timing in cases of
vowel sequences. Within a complex vowel sequence the timing and
obligatory stress on the second element combine to affect the previous
elements of the syllable i.e. vowel and optional consonant. When the
same vowel sequences occur with the timing of two syllables, the
vowels receive their full phonetic quality and emic transitional
sound acts to separate the syllables.

3.3 The use of emic transitional sound to identify syllable boundaries

   Having established the existence of complex vowel sequences with
differing nuclear stress within a syllable, we note that there are
also suspect sequences of three vowels, in which the central element
is transitional and can be interpreted as a continuant.

['a.iɔ]	/	['ayɔ]	'blood'
['ta.iɔ]	/	['tayɔ]	'shadow/reflection'
['ɔ.iɔ]	/	['ɔyɔ]	'native beer'
[ɔ'iɔ]	/	[ɔ'yɔ]	'tree (type)'
['mɔ.iɔ]	/	['mɔyɔ]	'tooth'
[di'au]	/	[di'yau]	'tree (type)'
['ɔ.uɔ]	/	['ɔwɔ]	'older sister'

These sequences are not pronounced as glides plus a vocoid onset or
closure. When spoken slowly these words are clearly two syllables:
[a-yɔ], [ta-yɔ], [di-yau], etc. Stress reversals in identical
environments also encourage interpretation as two syllable words
rather than complex three vowel sequences (none of these words fit
the complex vowel patterns previously discussed). Their timing on
the oscilloscope places them along with other multi-syllable words
in the language. Therefore, since no non-suspect sequences of three
vowels occur, and since these suspect sequences involve the
transitional sound of /w/ or /y/, we choose to interpret these as
phonemic sounds which serve to separate syllables. The above words
would appear phonemically as two syllable words.

/'ayɔ/	'blood'
/'tayɔ/	'shadow/reflection'
/'ɔyɔ/	'native beer'
/ɔ'yɔ/	'tree (type)'
/'mɔyɔ/	'tooth'
/di'yau/	'tree (type)'
/'ɔwɔ/	'older sister'

It now follows that we must consider all other possible vowel
sequences in the language. All vowel sequences, except the complex
sequences already considered, cross syllable boundaries as indicated
by timing, and represent only a small, random portion of the 144
possible vocoid combinations.

ie	-	['ie]	'go'
ię	-	[di'e]	'3rd. plural. subj.'
ię	-	[ni'e]	'2nd plural subj.'
ia	-	[bi'adi]	'morning'
ia	-	[bi'abɔ]	'rooted'
io	-	[fi"olo'la]	'to untie'

iɔ - [fi"ɔlo'la]   'to deny'

iɔ̞ - ['tiɔ̞]   'arrow (generic)'

iɔ̞̞ - ['hi̞ɔ̞]   'wild'

ea - ["ɔle'a]   'banana (type)'

ea̞ - [fe̞'afɔ]   'little'

uɔ - ['kuɔ]   'up stream'

u̞ɔ̞ - [hɔ̞'nu̞ɔ̞]   'stinging nettles'

uɔ̞ - ['du̞ɔ̞]   'drum'

ɔa - [sɔ'ali]   'fish (type)'

ɔą - [tɔ'ąka]   'shoe'

Since relatively few of the total number of possibilities occur,
and since transition sound is involved across all syllable boundaries,
we choose to interpret these sequences as two syllables with an emic
consonantal continuant between. Thus the only vowel sequences in the
language are those described as being within a single syllable with
various nuclear stress patterns which affect the vocoid quality of
the vowels involved. Across syllable boundaries, emic transitional
sound occurs and must be indicated in order to distinguish single
complex syllables from multi-syllable sequences.

['tɔ͡ə]   /'tɔe/   'slope'

['tɔ.e]   /'tɔwe/   'fish (type)'

[tɔ'e]   /tɔ'we/   'understand'

['ka͡e]   /'kae/   'digging stick'

['ka.e]   /'kaye/   'cut!'

['sa͡i̞]   /'sa̞i̞/   'penis'

[sa̞'i̞]   /sa̞'yi̞/   'withered'

['hi̞ɔ͡wɔ̞]   /'hi̞ɔwɔ̞/   'eye'

[hi̞'ɔ]   /hi̞'yɔ̞/   'wild'

The continuants /w/ and /y/, therefore, also serve to identify
syllable boundaries between vowel sequences and reinforce the
consonant-vowel pattern in the language.

This interpretation of transitional sounds between syllables as emic, and the recognition of two basic types of vocoid sequences within a syllable, results in an internally consistent pattern throughout the sound system of the Samo language. There are no consonant clusters, and vowel sequences occur only within a syllable. Within a syllable vowels may occur as a single unit, a close knit vowel sequence or glide, a complex sequence, or a combination of the latter two. In each case the length of time taken to pronounce the syllable is approximately the same. Thus the more complex the vowel sequence, the more rapidly it is spoken.

4 DISTRIBUTION

4.1 General distribution

In Samo the emic syllable is defined as a unit of stress placement. It may consist of a single vowel nucleus, a close knit vowel sequence with nuclear stress on either member, or a complex vowel sequence with stress only on the second element of the unit. This vowel nucleus may be preceded by an optional onset composed of a single consonant. Samo syllables never have closure.

The following syllable patterns occur: V, VV, CV, CVV, and CVVV. Words are comprised of from one to eight syllables with the limitation that a V syllable only occurs initially.

4.1.1 Examples of how syllables form words

One syllable words

V	/'u/	'bird (type)'
VV	/'ɔu/	'hole'
CV	/'ha/	'cheek'
CVV	/'tɔi/	'forbidden'

Two syllable words

      V.VV   /ɔ'uɔ/   'betrothed'

      V.CV   /'abɔ/   'grandmother'

      V.CVV   /e'bɔi/   'snake (type)'

      VV.CV   /'ɔibɔ/   'fish (type)'

      CV.CV   /'wamɔ̞/   'secretly'

      CVV.CV /'kaibɔ/   'fish (type)'

      CV.CVV /gɔ'ma̞u̞/   'tree (type)'

      CV.CVVV /kɔ'goai/   'pregnant'

      CVVV.CV /'koaimɔ̞/   'plenty'

Three syllable words

      V.CV.CV   /e'bɔbo/   'tree (type)'

      V.CV.CVV   /ɔ̞'sɔbɔi/   'python'

      V.CVV.CV   /a'diɔmɔ̞/   'door/entrance'

      CV.CV.CV   /kɔ'lage/   'banana (type)'

      CV.CVV.CV   /kɔ'goabo/   'spirit medium'

      CV.CV.CVV   /"yɔlɔ'gau/ 'bird (type)'

These examples are typical of the combinations of syllables in words.
Few words are more than four syllables, but some affixed verbs can
extend to eight syllables.

4.2 Distribution of consonants

All consonants occur word initial. However in the corpus /l/
never occurs initially before /u/, and /w/ does not occur initially
before /i/ or /u/. Otherwise all consonants occur initially before
all vowels.

All consonants also occur word medial with the restriction that
/t/ and /k/ tend to neutralize with their voiced counterparts as
described on pages 104 and 105. /w/ never occurs before /u/.

4.3 Distribution of vowels

All oral and nasal vowels occur initial, medial, and final and
may follow all consonants, except that /u/ may never follow /w/.

Vowels may never double on themselves, i.e. there is no vowel length
in Samo. Within complex sequences of vowels /o/ may only precede /a/
and /ɔ/. /o/ and /i/ may co-occur in a complex vowel sequence with a
glide, however there are no examples in the corpus of /u/ doing so.
/o/ plus vowel and /i/ plus vowel only occur following a consonant,
never initially.

PHONOLOGIES OF FIVE

P.N.G. LANGUAGES