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CONTRASTIVE DISTRIBUTION OF PHONEME CLASSES IN IÇUÃ TUPI

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0. The purposes of this paper are (1) to describe the contrastive distribution of phoneme classes of Içuã Tupi, and (2) to make available data from this language which is almost extinct.[1] Therefore, in addition to the description of the phoneme classes and of other features of the phonological structure in 1-5, a sketch of some morphophonemic rules is given in 6.

The phoneme classes of Içuã Tupi are: semivowel, vowel, and consonant. These three classes are posited in order to attain a simple interpretation of sequences including from one to five vocalic phones, e.g. [ipɪ'tuiuãĩm] he is sickly. The types of problems involved include the interpretation of the following: (1) sequences which could be transcribed phonetically as [C^yV][2] and [C^wV] in contrast to [CiV] and [CuV]: ['waikyɛ] he is angry versus [gara'piɛd^n] he is chopping, and [i'tak^{w}ad^n] cane versus [tə̃mə̃'^{n}duəhu] anteater; (2) sequences which could be transcribed phonetically as [ai] in contrast to [ai]: [pɛ'pai bid^n] fin versus [apa'itĩd^n] chaff; and (3) sequences which could be transcribed phonetically as [wV] in contrast to [uV]: ['wii] blood versus ['uibɛ] arrow.

The non-syllabic vocalic phones in [C^y] and [C^w], [ai], or [yV] and [wV] can be interpreted (1) as consonants /y/ and /w/, or (2) as vowels /i/ and /u/, or (3) as consonants in some situations and as vowels in others. Following the first interpretation a word such as [ə̃'mõŋg^{w}ai] he is chopping would be rewritten */ã'bõgway/. (See 3 for the phonemicization of nasal phones and pre-nasalized voiced stop phones.) Following the second interpretation, it would be rewritten */ã'bõguai/. Following the third interpretation one possibility would be to rewrite it

*/ã'bõgwai/. Syllable division would have to be indicated in the phonemic transcription in either of the latter two interpretations in order to distinguish [a^{i}] from [ai].

With one of the above three interpretations, syllable patterns with either consonant clusters or vowel clusters, i.e., either */CCVC/, or */CVVV/, or */CCVV/ would result. It was noted that such patterns occur only when high vocalic phones [i, y, u, w] are involved. That is, all sequences of vocalic phones within a syllable include /i/ or /u/ as at least one member. Sequences of two vocalic phones occurring in the data are: [ai], [ui], [oi], [ɔi], [iɛ], [ia], [iu], [uɛ], [ua], [ũĩ], [õĩ] [ĩã], and [ũã]. Note that [ɛ], [a], [ɔ], and [ɪ] do not occur in sequence with each other, whereas [i] and [u] do. Furthermore, all sequences of consonantal phones would include [y] and [w] as at least one member: [ky], [kw], [ʔw], etc. It was, therefore, decided to reject an interpretation in terms of two pheneme classes in favor of an interpretation in which /i/ and /u/ are semivowels,[3] a third class of phonemes. The basis for such an interpretation is their contrastive distribution with both vowels and consonants. Details of the contrastive distribution of the three classes can be seen in the syllable formulas in 4.

This type of analysis provides a relatively simple interpretation of sequences of vocalic phones. The non-syllabic vocalic phones in [C^{y}V], [C^{w}V], [yV], and [a^{i}] are interpreted as allophones (transcribed as [i̯] and [u̯] in the remainder of the paper) of the semivowels /i/ and /u/. These phonemes also have syllabic allophones [i] and [u] which occur in the syllable nucleus: [u'ɾuku] /u.ru.ku/ red dye. [s'mõŋg^{w}a^{i}] he is chopping is rewritten /ã'bõguai/ with the resultant syllable pattern [CSVS]. Simplicity is attained (1) in that in going from a phonetic transcription to a phonemic one all high vocalic phones are written consistently as /i/ or /u/ and (2) in that the only clusters of phonemes of a single class which must be posited within a single syllable are /SS/: ['uii] /ui.i/ blood; /CC/ is interpreted as /CS/ and /VV/ as /SV/ or /VS/. The interpretation does necessitate, however, defining syllables in order to go from a phonemic transcription to a phonetic transcription of the semivowels. Syllable boundaries are, therefore, indicated by a period, e.g. /CSV.SV.S/, in phonemic transcriptions in the remainder of the paper.

1.0. Semivowels comprise two classes, oral and nasal. They are in contrast in analogous environments as shown by the following examples:

/i/ /ĩ/: [a'bati] /a.ba.ti/ corn, [a'hɛtĩ] /a.hɛ.tĩ/ his nose
/u/ /ũ/: [u'ɾuku] /u.ru.ku/ red dye, [a'hɛkũ] /a.hɛ.kũ/ his tongue
/i/ /u/: [a'bati] /a.ba.ti/ corn, [taɪ̯'tɪtu] /tai.ti.tu/ wild pig
/i/ /ũ/: ['itĩŋ] /i.tĩg/ it is white, ['hɪtũŋ] /hi.tũg/ my mole.

1.1. In addition to the syllabic allophones illustrated above, oral and nasal semivowels have non-syllabic allophones as shown in the following examples:

/i/ [i̯ = y]: [ikɨ̯ɛˈtĩŋãĩ̯m] /i.kiɛ.tĩ.gãĩb/ alligator
/ĩ/ [ĩ̯ = ỹ]: [ˈikĩ̯ãŋ] /i.kĩãg/ bone
/u/ [u̯ = w]: [ˈu?u̯i] /u.?ui/ farina
/ũ/ [ũ̯ = w̃]: [ˈkũ̯ãⁿdu] /kũã.du/ chicken hawk.

Whether a semivowel is phonetically syllabic or non-syllabic can be predicted by the application of the following ordered rules:

(1) A sequence consisting of a low vowel [ɛ] or [ɔ][4] followed by a semivowel of the same point of articulation, i.e., front or back, is phonetically the mid vowel of the same point of articulation, i.e., [e] or [o]: /a.hɛi/ [ˈahe] she is carrying on back, /bɔ̃ũ.tu.gi/ [mðˈtugi] a type of fly.

(2) A semivowel contiguous to a vowel in the same syllable is the non-syllabic allophone [i̯] or [u̯] of a semivowel: /ai.tab/ [ˈai̯tabᵐ] he is swimming, /a.puad/ [ˈapu̯adⁿ] he is hitting. Note that /ɔu/ is rewritten as the vowel phone [o] by the application of rule 1. Therefore, a semivowel contiguous to /ɔu/ > [o] is non-syllabic by the application of rule 2: /hɛ.kɔui.bid/ [hɛˈkoi̯bidⁿ] bark wrapped around waist.

(3) A semivowel occurring as the only non-consonant of the syllable is the syllabic allophone [i] or [u] of a semivowel: /a.ba.ti/ [aˈbati] corn.

(4) In a sequence of semivowels in a single syllable, the first is non-syllabic and the second syllabic: /u.?ui/ [ˈu?u̯i] farina.

1.2. Oral and nasal semivowels /i/ and /ĩ/ also have additional syllabic allophones.

/i/ [ɪ] high open front unrounded semivowel occurs only between a consonant and a sequence consisting of a voiceless alveolar, voiceless velar stop, or the glottal fricative followed by a vowel, the back semivowel, or the non-syllabic allophone of the front semivowel: [ipɪˈtupabᵐ] /i.pi.tu.pab/ he is tired, [pɛbɔˈtɪki] /pɛ.bɔ.ti.ki/ there, [aˈdžɪhogŋ] /a.ji.hɔug/ he is bathing.

[i] oral semivowel occurs elsewhere: [ˈitə] /i.ta/ rock.

/ĩ/ [ĩ̯] high open front unrounded nasalized semivowel occurs between a consonant and a sequence consisting of a voiced alveolar stop or alveopalatal stop followed by a nasal vowel or nasal semivowel, or it occurs between a consonant and a sequence consisting of a syllable initial nasal semivowel /ũ/ followed by a vowel: [tĩˈnðⁿdɛ] /tĩ.dɔ̃ũ.dɛ/ front, [ũ̯ɜˈnɰ̃ɛ̃] /ũã.dĩ.jɛ̃/ fishtail, [hipũˈɰ̃ĩ̯ũ̯ɜ] /hi.pũ.jĩ.ũã/ my ankle.[5]

[ĩ̯] nasal semivowel occurs elsewhere: [ˈhɪtĩ̯] /hi.tĩ/ my nose.

2.0. Vowels comprise two classes, oral and nasal. Oral vowels /ɛ/, /a/, /ɨ/, and /ɔ/ are in contrast with corresponding nasal vowels in analogous environments:

/ɛ/ /ɛ̃/: [aˈpo?ɛ] /a.pɔu.?ɛ/ other one, [ɜˈmõ ?ɛ̃] /ã.bɔ̃ũ?ɛ̃/ he is teaching
/a/ /ã/: [hidiˈbi̯apɛ] /hi.di.bia.pɛ/ my buttocks, [iˈpĩ̯ãpɛ̃] /i.pĩã.pɛ̃/ claw
/ɨ/ /ɨ̃/: [hatiˈpɨ̈ɔi] /ha.ti.pɨ̈.ɔi/ small tooth ache, [ai̯buˈɔĩ̯ɔũ̯ĩ̯] /ai.bu.?ɨ̃.?ũĩ/ he is digging like a dog
/ɔ/ /ɔ̃/: [ˈpɛbɔ] /pɛ.bɔ/ there, [ˈai̯bõ] /ai.bɔ̃ũ/ he is blowing a dart.

2.1. Oral and nasal vowels occur at the following points of articulation: /ɛ/ /ɛ̃/: mid open front unrounded (nasalized) vowel, /a/ /ã/: low open central unrounded (nasalized) vowel, /ĩ/ /ɨ̃/: high close back unrounded (nasalized) vowel, /ɔ/ /ɔ̃/: low close back rounded (nasalized) vowel.

Oral vowel phonemes /ɛ/, /ĩ/, and /ɔ/ are in consrast in identical environments: [ˈhipɛ] /hi.pɛ/ my mirror, [ˈhipĩ] /hi.pĩ/ my hand, [ˈhipɔ] /hi.pɔ] /hi.pɔ/ my foot.

Oral vowel /a/ is in constast with /ɛ/, /ĩ/, and /ɔ/ in analogous environments: [taɨtɪˈtupə] /tai.ti.tu.pa/ wild pig.

Oral vowel /ɛ/ and oral semivowel /i/ contrast in analogous environments: [ɛˈpihiu] /ɛ.pi.hiu/ big bass, [iˈpũ͡ŋgɛ] /i.pũ.gɛ/ blister.

Oral vowel /ĩ/ and oral semivowel /u/ contrast in analogous environments: [hiˈkɨ͡ɛtĩ] /hi.kiɛ.tĩ/ over there, [iˈkɨ͡ɛtu] /i.kiɛ.tu/ good.

Oral vowel /ĩ/ and oral semivowel /i/ contrast in analogous environments: [hiˈkɨ͡ɛtĩ] /hi.kiɛ.tĩ/ over there, [ˈhati] /ha.ti/ horn.

Nasal vowel phoneme /ɛ̃/ and nasal semivowel /ĩ/ contrast in analogous environments: [ˈkaʔɛ̃m] /ka.ʔɛ̃b/ day, [ˈhɛʔĩm] /hɛ.ʔĩb/ corn cob.

Nasal vowel phoneme /ɨ̃/ and nasal semivowel /ĩ/ contrast in analogous environments: [aɨbuˈʔĩʔũ͡ĩ] /ai.bu.ʔĩ.ʔũĩ/ he is digging like a dog, [hɛˈ ĩmə̃hu] /hɛ. ĩ. bə̃.hu/ large corn cob.

2.2. Oral and nasal vowels /a/ and /ã/ have additional allophones. /a/ : [ə] mid close central unrounded vowel occurs only before a voiceless glottal fricative /h/ or word final: [u͡ɛˈdəhɔ] /uɛ.da.hɔ/ he is carrying, [taɨtɪˈtupə] /tai.ti.tu.pa/ wild pig. [a] occurs elsewhere: [baˈhapĩdⁿ] /ba.ha.pĩd/ three. /ã/ : /ə̃/ mid close central unrounded nasalized vowel occurs before a voiced stop phoneme /b/, /d/, or /g/: [ˈpə̃nə̃m] /pã.dãb/ butterfly; or before voiceless glottal fricative /h/: [tũˈpə̃hu] /tũ.pã.hu/ loud noise; or word final: [ˈtũpə̃] /tũ.pã/ thunder. [ã] low open central unrounded nasalized vowel occurs elsewhere: [ˈñãpĩdⁿ] /jã.pïd/ downhill.

3.0. Consonant phonemes comprise a series of four voiceless stops, a series of four voiced stops, the voiced alveolar flap /r/, and the glottal fricative /h/. Both stop series include phonemes at bilabial /p/, /b/, alveolar /t/, /d/, and velar /k/, /g/, points of articulation. In addition, the voiceless series includes glottal stop /ʔ/ and the voiced series includes the alveopalatal affricate /j/. This affricate is classed with the voiced stop series since the distribution of its allophones parallels that of the voiced stops.

These consonant phonemes are in contrast in analogous environments as shown in the following examples:

/p/ /b/: [iˈpipadⁿ] /i.pi.pad/ track, [tapiˈibadⁿ] /ta.pi.i.bad/ capybara.

/t/, /d/, /r/: [taˈtapũĩ] /taˈta.pũ.ĩ/ ashes, [au͡aˈdadžabᵐ] /a.ua.da.jab/ she is eating again, [apaˈɾaɾagŋ̍] /a.pa.ra.rag/ noise of wings.

/k/ /g/: [puˈdaki] /pu.da.ki/ eel, [ˈhagi] /ha.gi/ father.

/ʔ/, /h/, /r/: [hɛˈhuʔu] /hɛ.hu.ʔu/ sore throat, [kuɾuˈɾuhu] /ku.ru.ru.hu/ large frog, [tuˈpuɾu] /tu.pu.ru/ a fly.

/p/, /t/, /k/, /ʔ/: [daˈpadi] /da.pa.di/ it isn't bending, [taˈtapũĩ] /ta.ˈta.pũ.ĩ/ ashes, [taˈkapɛ] /ta.ka.pɛ/ water jaguar, [haˈʔadi] /ha.ʔa.di/ small ear of corn.

/b/, /d/, /j/, /g/: [baˈdžɹhu] /ba.ji.hu/ boa constrictor, [daˈpadi] /da.pa.di/ it isn't bending, [džataˈbugəhu] /ja.ta.bu.ga.hu/ large tick, [gaɾaˈpiɛdⁿ] /ga.ra.pi.ɛd/ he is chopping.

/ʔ/ / ∅ : [ˈaiʔiu] /ai.ʔiu/ he is drinking, [aĵaˈpapadⁿ] /ai.ia.pa.pad/ it is crooked.

3.1. Voiced stops /b/, /d/, /j/, and /g/ have oral and nasal allophones.

Voiced prenasalized stops [ᵐb], [ⁿd], [ñdž], and [ŋg] occur only following a nasal vowel or nasal semivowel and preceding an oral vowel or oral semivowel: [hõᵐbĩgŋ] /hõũ.bĩg/ urine, [ˈpĩⁿdabᵐ] /pĩ.dab/ a type of leaf, [ĩˈŋguuɛ] /ĩ.gu.uɛ/ pilon, [pɛ̃ˈñdžuɾu] /pɛ̃.ju.ru/ your mouths.

Voiced postnasalized stops [bᵐ], [dⁿ], and [gŋ] occur only word finally after an oral vowel or oral semivowel: [ˈidžubᵐ] /i.jub/ it is orange, [taˈpiidⁿ] /ta.pi.id/ tapir, [ˈibagŋ] /i.bag/ cloud.

Voiced bilabial nasal [m], voiced alveolar nasal [n], and voiced alveopalatal nasal [ñ] occur before a nasal vowel or nasal semivowel word initially: [mõˈtugi] /bõũ.tu.gi/ a type of fly, [nəˈmənõĩ] /dã.bã.dõũĩ/ she isn't dying, [ˈñõ] /jã/ Brazil nut.

[m], [n], [ñ], and voiced velar nasal [ŋ] occur between nasal vowels or nasal semivowels word medial: [ãˈmĩpadⁿ] /ã.bĩ.pad/ it is breaking, [kãˈnĩⁿdɛ] /kã.dĩ.dɛ/ macaw, [ẽñõˈⁿdəhu] /ã.jã.da.hu/ he is running, [itĩˈnĩŋĩhĵu] /i.tĩ.dĩ.gĩ.hiu/ she is skinny.

[m], [n], and [ŋ] occur after a nasal vowel or nasal semivowel word finally: [ˈpẽnẽm] /pã.dãb/ butterfly, [ˈapɛ̃n] /a.pɛd/ it is breaking, [ˈiũẽŋ] /i.ũãg/ it is red.

Voiced stops [b], [d], [j], and [g] occur elsewhere: [iˈbiɾə] /ɹbi.ra/ dry stick, [ˈpidə] /pi.da/ fish, [ˈidžɛ] /i.jɛ/ clay, [ˈgə] /ga/ he. Note, however, that no allophone of /j/ occurs word finally.

It could be presumed that the gaps in the occurrences of [ñ], and [ŋ] in relation to the occurrences of the other nasals were due to a lack of data. The limitation is interpreted here, however, as systematic since, with the exception of word initial [g] preceding oral vowels, the full series of voiceless stops or the full series of voiced stops occurs only medially as seen in the following chart of distribution of phones.

Initial				Medial					Final		
p	t	k		p	t	k	ʔ		p	t	k	
b	d	j	g	b	d	j	g		b^m	d^n		$g^ŋ$
				$^m b$	$^n d$	$^ñ dž$	$^ŋ g$					
m	n	ñ		m	n	ñ	ŋ		m	n		ŋ

3.2. The voiceless stop /t/ has a prenasalized allophone [^{n}t]. The distribution of this allophone parallels that of the prenasalized allophones of the voiced stops, i.e., it occurs following a nasal vowel or nasal semivowel and preceding an oral vowel or semivowel: [akɛ̃'^{n}tadəhui] /a.kɛ̃.'ta.da.hu.i/ chief's hat.

4. A syllable is defined as a single mora of length consisting of a nucleus of a single vowel or syllabic allophone of a semivowel with an optional onset and optional terminus.[6] Syllable patterns are summarized by the following two formulas:[7]

(1) ± Onset: [±C ±S] + Nucleus: V ± Terminus: [±S ±C/S]
(2) ± Onset: [±C ±S] + Nucleus: S ± Terminus: C

As is seen in the formulas, semivowels /i/ and /u/ occur both in the positions of the syllable filled by vowels and those filled by consonants. Thus, the three phoneme classes contrast in distribution as follows: (1) Vowels occur only in the nucleus position. (2) Consonants occur only as the first or only phoneme in the onset position or as the second or only phoneme in the terminus position. (3) Semivowels occur in the nucleus position, or as the second or only phoneme in the onset position, or as the first phoneme, or only phoneme, or the first and second phonemes in the terminus position.

Readings of the syllable formulas are divided according to those syllables which can occur word initial, medial, or final and those which can occur only word final. Numbers in parentheses refer to the rules in 1.1 governing semivowels since the examples illustrate the application of these rules as well as readings of the syllable formulas.

(1) Syllables which can occur word initial, medial, or final are shown in the following examples:

V a- in ['atə] /a.ta/ he is walking
-a- in [ide'akuab^{m}] /i.dɛi.a.kuab/ eye of animal
-ĩ in ['dʒĩĩ] /jĩ.ĩ/ ax

SV uɛ- in [uɛ'dəhɔ] /uɛ.da.hɔ/ he is carrying (2)
-ua- in [hɪtu'uəhu] /hi.tu.ua.hu/ my big navel (2)
-ua in [hɪ'tuuə] /hi.tu.au/ my navel (2)

VS ai- in ['aipɛ] /ai.pɛ/ other one (2)

SVS uai- in ['uaikiɛ] /uai.kiɛ/ he is angry (2); -uai- in [ake'uaibɛ̃nɛ̃] /a.kɛi.uai.bɛ̃.jɛ̃/ wild Indian (2); -uai in ['auai] /a.uai/ anklet (2)

CV ta- in ['tatə] /ta.ta/ fire
-ta- in [ta'tafĩŋ] /ta.ta.fĩg/ smoke
-ta in ['tatə] /ta.ta/ fire

CSV kũã- in ['kũã^{n}du] /kũã.du/ chicken hawk (2)
-kiɛ- in [ikiɛ'fĩŋãĩm] /i.kiɛ.tĩ.gãĩb/ alligator (2)
-kiɔ in [i'dikiɔ] /i.di.kiɔ/ blood of animal (2)

CVS bãĩ- in [mãĩ'kəhu] /bãĩ.ka.hu/ much (2)
-hai- in [apa'haikad^{n}] /a.pa.hai.kad/ it is wiggling (2)
-dai in ['hidai] /hi.dai/ my teeth (2)

CSVS -kuai- in [hida'kuaihiu] /hi.da.kuai.hiu/ my large penis (2)
-kuai in [hi'dakuai] /hi.da.kuai/ my penis (2)

S i- in [ˈitə] /i.ta/ rock (3)
-i- in [tapiˈibadⁿ] /ta.pi.i.bad/ capybara (3)
-i in [ˈu̯ii] /ui.i/ blood (4)
SS ui- in [ˈu̯ii] /ui.i/ blood (4)
-ɪ̃ũ- in [ñãtɪ̃ ˈɪ̃ũʔɪ̃] /jã.tɪ̃.ɪ̃ũ.ʔɪ̃ / mosquitoe (4)
-ɪ̃ũ in [ñãˈtɪ̃ɪ̃ũ] /jã.tɪ̃.ɪ̃ũ/ mosquitoe (4)
CS hi- in [hidaˈtipɪ̃] /hi.da.ti.pɪ̃/ my cheek (3)
-pi- in [taˈpiidⁿ] /ta.pi.id/ tapir (3)
-hi in [ˈhahi] /ha.hi/ it is hurting (3)
CSS -diu- in [hadiu̯ˈbiiabᵐ] /ha.diu.bi.iab/ banana plant (4)
-hiu in [kaˈdihiu̯] /ka.di.hiu/ civilized person (4)
CVSS kɔ̃ũ̃ɾ- in [kɔ̃ɪ̃ ˈmɛ̃ɾ̃ŋgɛ] /kɔ̃ũ̃ɾ.bɛ̃.gɛ/ boy (1) (2)
-kɔui- in [hɛˈkoi̯bidⁿ] /hɛ.kɔui.bid/ bark wrapped around waist (1) (2)
-dɔ̃ũ̃ɾ in [nə̃ˈmə̃nɔ̃ɪ̃] /dã.bã.dɔ̃ũ̃ɾ/ he isn't dying (1) (2)

All consonants except / ʔ / and /r/ occur syllable initially in a word initial syllable. All consonants occur syllable initially in word medial and word final syllables.

(2) Syllables which can occur only word finally are shown in the following examples:

VC -ab in [aˈⁿhɛabᵐ] /a.hɛ.ab/ his hair
VSC -ãĩb in [ipɪˈtuiu̯ãĩm] /i.pi.tu.iu.ãĩb/ she is sickly (2)
CSVC -kĩãg in [ˈikĩ̃ə̃ŋ] /i.kĩãg/ bone (2)
CVSC -bãĩb in [hiˈdɛ̃mãĩm] /hi.dɛ̃.bãĩb/ my lip (2)
SVSC -uaib in [ˈⁿkɛu̯ai̯bᵐ] /kɛ.uaib/ Indian group (2)
SC -id in [taˈpiidⁿ] /ta.pi.id/ tapir (3)
SSC -uid in [aˈdžau̯idⁿ] /a.ja.uid/ he is sanding (4)
CSC -jib in [gɛˈdadžibᵐ] /gɛ.da.jib/ his gum (3)
CSSC - ʔiub in [ˈiʔi̯ubᵐ] /i.ʔiub/ corn stalk (4)

Consonants which occur in the terminus position are limited to /b/, /d/, /g/. Further restrictions on the readings of the syllable formulas are: (1) Only four segments are permitted, i.e., either Onset or Terminus may be complex but not both. (2) Terminus SS occurs only in sequences involving /ɔui/ [oi]. (3) All semivowels and vowels within a single syllable are either oral or nasal. (Note, for example the contrast of /C$\tilde{V}$.SV/ in [ˈnĩi̯ə] /dĩ.ia/ they with /C$\tilde{V}\tilde{S}$./ [mãĩ̯ ˈⁿkəhu] /bãĩ.ka.hu/ much and /CVS./ in [ˈkaiũ̃ə̃ŋ] /kai.ũ̃ãg/ howler monkey.)

5. Accent is manifested by stress and high pitch occurring on the same syllable as a suprasegmental phoneme. Absence of accent is manifested by low pitch without stress.

In the predominant word patterns accent occurs on the penult in two, three, and four syllable words, e.g., [ˈitĩŋ] /i.tĩg/ it is white, [tai̯ˈtɯtu] /tai.ti.tu/ wild pig, [patiˈu̯apɛ] /pa.ti.ua.pɛ/ bark pan, and on the antepenult in five or more syllable words, e.g., [abiˈdabidabᵐ] /a.bi.da.bi.dab/. In less frequent word patterns accent occurs on the antepenult of three and four syllable words, e.g. [ˈuibɛ] /ˈu.i.bɛ/ arrow,

[ta'tapũĩ] /ta.'ta.pu.i/ ashes, and on the third syllable of six syllable words, e.g., [ahɛ'abɛbui] /a.hɛ.'a.bɛ.bu.i/ his lung. Accent is, therefore, contrastive but is indicated only on words which do not follow the predominant patterns. It is not included in the syllable formulas and readings in 4.

6. Some of the morphophonemic alternations which have been observed are described here.

A morpheme final voiced stop followed by a morpheme initial voiced stop at the same point of articulation is reduced to a single voiced stop [$-C_1 \# + \#C_1 \rightarrow C_1$]. Note the following examples: ['itĩŋ] = i- descriptive verb marker + -tĩŋ white > /i.tĩg/ it is white; [kai'tĩ^{n}gi] = kai- monkey + -tĩŋ white + -gi small > /kai.ti.gi/ zogi monkey.

Subject pronouns, which may occur within a clause in addition to person-marking prefixes in the verb, are phonologically free in affirmative constructions. Free pronouns differ from bound pronouns in that they are accented and in that time, or object, or other clause-level components can occur between them and the verb: /'ga 'kidãbɛ̃ĩ 'aʔig 'ai/ he yesterday he-talk past-tense; /ã'bãpãd 'ga 'jɛʔuada 'dai/ he-cause-break he dog tooth (he broke the dog's tooth). Note the two accents in the following examples: ['hi 'apuad^{n}] /hi a.puad/ I am hitting; ['ga 'apuad^{n}] /ga a.puad/ he is hitting.

In negative constructions, when no pronoun occurs, the transitive verb ['apuad^{n}] [da'puadi] /da.pua.di/ (boy) is not hitting. (Prefix d- and suffix -i are the negative markers.) When the pronoun is included in negative constructions, however, it is phonologically bound to the verb as shown by the single accent and the occurrence of the word medial prenasalized allophone of /d/. This is shown in the following examples which should be compared with the affirmative examples above: [hĩ^{n}da'puadi] /hĩ.da.pua.di/ I am not hitting; [gã^{n}da'puadi] /gã.da.pua.di/ he is not hitting.

Verb stems are divided into eight classes depending on which of the following eight sets of person markers they occur with.

	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6	Set 7	Set 8
1st. sg.	a-	ahɛ-	ahu-	ahɛ-	ɛ-	h-	ai-	i-
2nd. sg.	dɛa-	hɛ-	hu-	dɛhɛ-	dɛ-	dɛh-	dɛi-	dɛ-
3rd. sg. or pl.	a-	uai-	uu-	uɛ-	uɛ-	h-	ai-	i-
1st. pl.	tia-	tihɛ-	tihu-	tihɛ-	ti-	tih-	tɛi-	ti-
2nd. pl.	pɛa-	pɛhɛ-	pɛhu-	pɛhɛ-	pɛ-	pɛh-	pɛi-	pɛ-

Each of these person marking prefixes has a nasal as well as an oral allomorph. In the lists of the prefix sets above only the oral allomorphs are given. The nasal allomorphs differ from them only in that the vowels are nasalized. Some of the prefixes may be morphologically complex but are listed as units for the purposes of this paper.

Nasal allomorphs of person prefixes occur only before voiced stops.[8] Oral allomorphs of person prefixes occur before all phonemes. Hence each verb class is further subdivided into two subclasses. For

comparison note the following examples:

/-bã.dʒũ/ to die (Set 1, nasalized)
/ã.bã.dʒũ/ am dying 1st person singular
/dɛ.ã.bã.dʒũ/ are dying 2nd person singular
/ã.bã.dʒũ/ is dying 3rd person singular
/tĩã.bã.dʒũ/ are dying 1st person plural
/pɛ.ã.bã.dʒũ/ are dying 2nd person plural
/ã.bã.dʒũ/ are dying 3rd person plural
/-bi.iad/ to be happy (Set 1, oral)
/a.bi.iad/ am happy 1st person singular
/dɛ.a.bi.iad/ are happy 2nd person singular
/a.bi.iad/ is happy 3rd person singular
/tia.bi.iad/ are happy 1st person plural
/pɛ.a.bi.iad/ are happy 2nd person plural
/a.bi.iad/ are happy 3rd person plural

Some verbs are formed from the negation of another verb: /i.pa.pid/ is wide > /di.pa.pi.di/ is narrow. The prefix /d/ and the suffix /i/ are negative markers.

Verbs can be formed by the addition of the person marker prefix /a/ to a noun stem: /kua.da.hi/ sun > /a.kua.da.hi/ sun is shining.

Nouns are divided into three classes; obligatorily possessed, optionally possessed, and non-possessed. /jɛ.ta.ta.ʔi/ star and /a.ba.ti/ corn are examples of non-possessed and optionally possessed nouns, respectively. The noun stem /-ju.ru/ mouth is given with the possessive prefixes as an example of an obligatorily possessed noun:

/hi.ju.ru/ my mouth
/dɛ.ju.ru/ your mouth
/ga.ju.ru/ his mouth
/a.hɛ.ju.ru/ human mouth
/i.ju.ru/ non-human mouth
/ia.dɛ.ju.ru/ our mouths
/pɛ.ju.ru/ your mouths
/jã.ju.ru/ their mouths.

When the noun stem /ta.ta/ fire is possessed, the initial voiceless alveolar stop /t/ is changed to a voiced alveolar stop /d/ following the possessive prefixes: /hi.da.ta/ my fire.

When the noun stem /ɔ.ɔg/ house is possessed, the initial vowel /ɔ/ is replaced by voiced alveolar stop /d/ following the possessive prefixes: /ga.dɔg/ his house.

NOTES

1. Material for this paper was collected during various field trips, under the auspices of the Summer Institute of Linguistics, to the rubber plantation Iyaya. The plantation is located on the Içuã River, a tributary of the Mucuim River in the state of Amazonas, Brazil. Since the tribal name is not known, this language, a dialect of Tupi, is referred to as Içuã Tupi.

The first informant was Ite a monolingual woman in her late thirties. She was one of four Indians brought to the rubber plantation from the jungle by rubber workers. In September of 1965, she was killed by the Juma Indians. Two more of the original four Indians have died from diseases. The second informant and only known speaker is Pidaba, the monolingual, 12 year old son of Ite. He says that there are only two other families of his tribe still living deep in the jungle. By all indications this tribe is almost extinct, and there may be no further opportunities to gather data on this dialect.

I am much indebted to Mary Ruth Wise for help in presentation of the analysis.

2. Formulaic representations used in this paper are: > becomes; - morpheme boundary; : filled by; + obligatorily occurs; ± optionally occurs; = equals; [ ] phonetic; / / phonemic; * transcription in a possible interpretation; V vowel; S semivowel; C consonant; descVb descriptive verb.

3. See Bridgeman, Loraine, Kaiwa (Guarani) Phonology, IJAL 27.329-34 (1961) for a description of a related language in which /i/ and /u/ have both syllabic and non-syllabic allophones, but an interpretation in terms of two phoneme classes is followed.

4. Note that [ĩ] does not occur in sequences with either [u̯], [u], [i̯] or [i] in a single syllable, nor have sequences of [iɔ] been recorded. It would, therefore, be possible to interpret [ĩ] as /iɔ/ paralleling the interpretation of [e] and [o]. Pending further data, however, [ĩ] is interpreted as the vowel /ĩ/.

5. Note that [i] rather than [ɩ] occurs preceding a voiceless bilabial stop and [ĩ] rather than [ɩ̃] occurs preceding a voiced bilabial or voiced velar stop followed by a nasal vowel. It is therefore, possible to interpret /k/ as systemically alveopalatal rather than velar and /ʔ/ as systemically velar. The statement of the allophones could then be generalized as follows: [ɩ] occurs preceding voiceless acute stop and [ɩ̃] preceding a voiced acute stop followed by a nasalized vowel. Such an interpretation would not furnish a systematic explanation for word initial limitations of occurrence of voiced stop allophones in contrast to different limitations in word final position. Therefore, the distribution of [ɩ] and [ɩ̃] is listed rather than stated in terms of a phoneme class.

6. See Eugene E. Minor, Witoto Vowel Clusters, IJAL 22.131-37 (1956), for a similar definition of phonemic syllables.

7. An alternate possibility would be to consider non-syllabic allophones of semivowels as filling a position in a complex nucleus with the formulas:

±Onset: C + Nucleus: [±S +V ±S] ±Terminus: C
±Onset: C + Nucleus: [±S +S] ±Terminus: C

In this paper, however, non-syllabic allophones of semivowels have been interpreted as filling positions in the onset or terminus for the following reasons: (1) in stating the restriction that only four segments can occur in a single syllable, statement (a) which follows, seems

simpler than statement (b). (a) Either the onset or terminus may be complex but not both. (b) If the nucleus contains 3 segments, either the onset or terminus positions can be filled but not both; but if the nucleus contains only one or two segments, both the onset and terminus positions can be filled. (2) Following /p/, /k/, /g/, and /h/ the phonetic character of the non-syllabic allophone is that of a palatalized or labialized offglide of the consonant, [C^{y}] or [C^{w}]. (3) Syllable initially their phonetic character is that of a consonant [y] or [w]. That is, in the latter two cases, they occur in a phonetic onset position rather than in a phonetic nucleus position.

8. The interpretation of nasalization followed in this paper is that oral and nasal vowels are contrastive and that the occurrence of nasal allophones or prenasalized stop allophones of voiced stops within a phonological word is then predictable. This interpretation makes it necessary to distinguish two morphophonemic classes of voiced stops initially in verb roots, one occurring with oral allomorphs of a prefix set and one with nasal allomorphs of a prefix set. Further data might show that an interpretation of nasalization as a word prosody (as in Kaiwa, Bridgeman, op. cit.) would be more satisfactory.

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