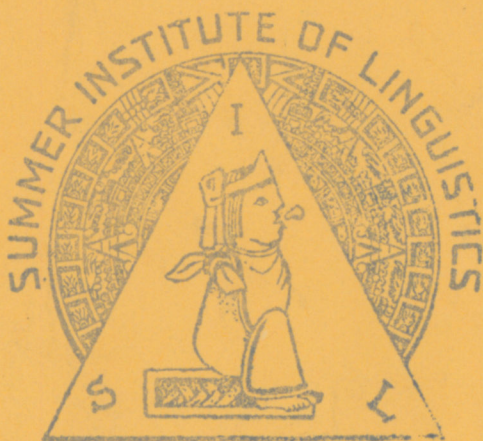


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SIERRA POPOLUCA SYLLABLE STRUCTURE

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1. This paper takes the syllable as the basis for an analysis of the phonemic distribution in the Sierra dialect of Popoluca of Veracruz.¹

With a single exception, every phonetic syllable or chest pulse constitutes a structural unit, i.e., a phonemic syllable; the exception: *m, n, ñ, ŋ* and *y*, when preceded by a glottal stop and followed by another

¹ The only available published material on the Popoluca language, aside from a few incomplete word lists, occurs in George Foster's article "The Geographical, Linguistic, and Cultural Position of the Popoluca of Veracruz," AA 45.531-46 (1943). In this brief paper Foster presents a tentative chart of the phonemes of the Sierra dialect, with brief discussions of palatalization and voicing of stops. His purpose however is to classify the Popoluca languages and presents only enough data to establish their position. The occurrence of the phonemes charted by Foster has been verified, and they are now described, with the inclusion of a further series, a set of voiced stops, which he did not handle as separate phonemic entities.

The material presented in this paper was gathered by the writer during the period 1943-45 while doing field work under the direction of the Summer Institute of Linguistics. Informants used were from the Sierra Popoluca village of Ocotal Chico, Ver. The principal informant was Fermin Gutierrez, but the data have been checked with others of the village.

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consonant or utterance-final silence. The consonants are phonetically syllabic in this position, but considering them as a part of the preceding syllable provides a neater and simpler description. For example, the word *heʔm* *that* has two chest pulses but is most conveniently described as constituting a single phonemic syllable. The following evidence supports this conclusion. (1) Other consonants which are never syllabic (such as voiceless stops) also occur following glottal stop and preceding silence: *ʔiʔkuʔt* *he ate it*, *muʔk* *grass*. This establishes a pattern CVʔC to which the pattern CVʔC might prove to be analogous. (2) The phonetically-syllabic nasals and *y* are never stressed. Vowels occurring in a similar situation (i.e., after [Vʔ]) are potentially stressed. Contrast *ʔhuʔŋmī* *with an owl* (in which the nasal never occurs stressed following the glottal stop) with *naʔamī* *with gum* (in which the vowel after glottal stop is stressed). Note also *huʔŋ owl* and *ʔnaʔa gum* with stress on vowel preceding the [ʔ]. These data force the investigator to conclude that the pattern CVʔC is distinct from CVʔV. From these evidences together, the conclusion is drawn that the phonetically-syllabic nasals and *y* function structurally like the final consonant in the pattern CVʔC and thus are to be considered a part of the preceding syllable; the two phonetic syllables, then, form a single phonemic syllable.

2. In Sierra Popoluca there are three types of syllables which may be considered basic, and one special type. The special type is named thus because it occurs very infrequently in the language and is not paralleled by other similar types. These types include a total of eight syllable pat-

terns. All syllable types have at least one initial consonant; all basic types have no more than one; the special type has two.

The first basic type is the open syllable. It may contain either a short vowel or a long vowel as the syllable nucleus. (For specific vowels occurring in the following patterns see Section 2.2.)

Pattern One CV ta.'nĭk.pa² *we (you and I) go*

Pattern Two CV' 'pĭ.pa *he gets fat*

Syllables closed by a single consonant constitute the second basic type. They, also, may contain either a long vowel or a short vowel as the syllable nucleus.

Pattern Three CVC ?i.'hĭk.pa *he dries it up (the river)*

Pattern Four CV·C ?i.'hĭ·k.pa *he pulls it*

The third basic type is composed of those syllables which are closed by a consonant cluster. These contain only a short vowel as the syllable nucleus.

Pattern Five CVCC' ?i.'hĭ?k.pa *he permits it*

Pattern Six CVCCC 'su?ks.pa *he coughs*

The special type³ includes syllables having an initial consonant cluster. These occur very infrequently.

Pattern Seven CCVC 'tray.tʃi *lad*

Pattern Eight CCVCC 'kru?y.čĭ *quail*

2.1. The nucleus of the syllable, as may be seen from the syllable patterns

² A raised dot indicates length; a dot on the line indicates syllable division.

³ In an article written by William Wonderly, *Phonemic Acculturation in Zoque*, IJAL 12.92-5 (1946), which appeared since this was written, a method was presented for describing Zoque phonemes which included Spanish loan words as a part of the Zoque language. Were this method to be applied to Popoluca (a related language), syllable patterns V, CCV, and CCV' would have to be added. Also the distribution of l and r would be changed in that then they would occur in syllable-final position. No new phonemes would be needed.

listed above, may only be composed of a vowel, or a vowel plus the supra-segmental phoneme of length. Popoluca contains six vowel phonemes, any of which may constitute the short nucleus, and all of which may be lengthened. These are i, ε, a, o, u, and ĭ. Of these six, four remain relatively stable, while i and o vary in quality depending on the surrounding sounds: i varies to [ɪ] when it occurs in the syllable before k if the preceding consonant is not an alveopalatal, h or w, and also when it occurs in the syllable before š if preceded by a glottal stop. Note, for example, 'pĭk.šĭ *bow*, ?ĭk.'ka.?a.ba *he kills him*, and '?iš.kuy *eye*. The other phonetically-unstable vowel o becomes [ɔ] when it occurs before velar consonants or č; for example, pok *gourd water jug*, 'moŋ.pa *he sleeps*, tʃoč.'hĭ·m.ñi *thicket*.

Short vowels in utterance-final position end in a lenis nonphonemic glottal stop, whereas long vowels end in a nonphonemic voiceless off-glide. For example: V 'nĭk.pa ['nĭk.pa?] *he goes*; V' yo·.'ša [yo·-'ša·A]⁴ *he worked*.

2.2. Syllable margins are composed only of consonant phonemes. Any consonant in Popoluca may occur in initial position in the syllable. Consonants which may occur only in syllable-initial position are: b 'ko.bak *head*; d '?i.doŋ *who knows*; dʃ⁵ dʃa *no*; g 'pa.gak *cold, fresh*; l 'le·mu *hoe*; r ru·tu.ho·p.kĭy *having bumps on the skin*.

All other consonants may occur singly in final position in the syllable. Those consonants which may occur following both types of syllable nuclei (long and short vowels) are: p ?i.'ñεp *he kicked it*, 'ho·p.pa *it rolls*; t 'pet.pa *he sweeps*, 'sε·t.pa *he returns*; tʃ 'witʃ.pa *he walks*, '?ε·tʃ.pa *it leans*; k mok *corn*, po·k *cornstalk*; c toc *tongue*,

⁴ Capital letters indicate voicelessness.

⁵ The phoneme dʃ and its voiceless counterpart tʃ are formed with the blade of the tongue, tip down.

nu.c'ne? *he is serious*; č ?i'čič *he jerked it*,
'mī.č.pa *he is playing*; s hos *hole*, ?i'hīs
he thought of it; š šiš *cow*, mε.š *also*; m
'nīm.pa *he says*, ca'm *very*; n hon *bird*,
'kī'n.pa *it smells good*; ñ 'miñ.pa *he comes*,
ca.ñ *snake*; ŋ 'moŋ.pa *he sleeps*, 'kī.ŋ.pa *he is*
afraid; y kuy *wood*, 'ho'y.pa *he takes a*
walk; h soh *oak tree*, ku.yu.h.'kī.'i.wiñ⁶
learners.

Of this group of phonemes the stops p, t, tʰ and k are aspirated in syllable-final position, if not followed by a phoneme of the same point of articulation. For example: 'kek.pa ['kek'.pa?] *it flies*, but kek.'gak.pa [kek.'gak'.pa?] *it flies again*.

When followed by a nasal of the same point of articulation (and not preceded by a glottal stop), voiceless stops p, t, and tʰ become a voiceless counterpart of the nasal, as in cap.'mε.y.mī [caM.'mε.y.mī?] *the ocean*, pet.'ne? [peN.'ne?] *it is swept*, and witʰ.'ñε? [wiN̄.'ñε?] *he has walked*. When preceded by a glottal stop, p, t, and tʰ do not undergo such modification, as for example, peʔt.'ne? [peʔt.'ne?] *they are laid side by side*.

The nasals m, n, ñ, ŋ, and the semi-vowel y have a lenis voiceless off-glide in utterance-final position. This voicelessness is particularly apparent if the last syllable in the utterance contains as its nucleus a short vowel and is stressed. If the utterance-final syllable contains a long vowel, or a short vowel which is unstressed, the voicelessness is slight but perceptible: ?i.'hon [?i.'hon^N] *his bird*; 'ka.mam ['ka.mam^M] *hard*; ca.ñ [tsa.ñ^{N̄}] *snake*; kuy [kuy^Y] *wood*.

The nonsyllabic vocoid h takes the quality of the syllabic it precedes or follows in the syllable. When h follows a nasal or y it becomes the voiceless counterpart of that nasal or y. For example: 'hεh.pa ['EεE.pa?] *he rests*; 'ha.tuŋ ['Aa.tuŋ^N] *father*; ?an.'hε.pε [ʔan.'Nε.pε?] *my cup*; ka.m.-

'ho'm [ka.m.'Mo'm^M] *in the cornfield*; kuy.-'ho'm [kuy.'Yo'm^M] *in wood*.

A problem of phonemic interpretation of the phonetic data involves the varieties of voiceless nasals which represent three distinct phonemes. (See above.) In utterance-final position, a lenis [N]⁷ is a member of the phoneme n, as a mere off-glide to silence, as in hon [hon^N] *bird*. After syllable division it is a releasing consonant and functions as a member of the phoneme h, since h following a nasal becomes a voiceless counterpart of the nasal, as in ?an.'ha.tuŋ [ʔan.'Na.tuŋ^N] *my father*. Preceding syllable division, it is an arresting consonant and functions as a submember of the phoneme t, as in hεt.'ne? [hεN.'ne?] *it is punctured*.

The unit [N] cannot be assigned to the phonemes t or n because of contrasts such as ?an.'ha.tuŋ [ʔan.'Na.tuŋ^N] *my father* versus an.'tik *my house* and an.'nak *my toad*.

The unit [N.] cannot be assigned to the phonemes h or n because of contrasts such as hεt.'ne? [hεN.'ne?] *it is punctured* versus hεh.'ne? *he rested* and pen.'ne? *it is squeezed (between fingers)*.

Nor can utterance-final [-^N] be assigned to any consonant other than as an off-glide of the n which it follows since there are no parallel consonant clusters in utterance-final position.

Certain consonant phonemes occur after only one type of syllable nucleus: glottal stop after short vowels only, w after long vowels only, as nī? *water*, 'ñi.w.hon *red-bird*.

Syllable-margin clusters, other than those initial ones previously listed under syllable patterns (see Section 2), occur in syllable-final position only. These are of two types: those which have a prefinal glottal stop and those without the glottal stop.

Clusters not containing the glottal stop

⁷ What applies to [N] is also applicable to [M] and [N̄]. It applies to [N] except that the unit [N.] would never occur, since the cluster *k.ŋ does not occur.

⁶ The illustration cited is the only known example of a long vowel preceding h in the syllable.

are: ps 'mɛps.pa *it is being cut (with scissors)*; ks 'hiks.kīy *fast*.

Clusters containing the prefinal glottal element may be either glottal stop plus a single phoneme or glottal stop plus the above clusters, ps or ks: ?p ?i.'ha?p.pa *he grinds it*; ?t to?t *earthworm*; ?tʷ ?i.'wi?ʷ.pa *he winds it*; ?k so?k *grass*; ?c cu?c *corpse*; ?č 'pi?č.pa *it goes out (the fire)*; ?m hɛ?m *that*; ?n ?i.'pɛ?n.pa *he builds-a-nest*; ?ñ hi?ñ.ñɛ? *it is tangled up*; ?ŋ hu?ŋ *owl*; ?y ci?y *he stayed behind*; ?ps 'so?ps.pa *he tires*; ?ks 'su?ks.pa *he coughs*.

2.3. The chief limitations between consonants and vowels within the syllable are between the alveolar series of consonants and the high vowel i.⁸ In syllable-final position only two examples of alveolars following i have been observed. These are the t in 'ti.t.tit *mestizo*, and the n in tʷa.'ga.lin *large spider*. Alveolars have been observed to precede i in the syllable, but their occurrence is infrequent due to the palatalizing effect of i in its occurrence in most morphemes. That the sequence alveolar plus i does occur is shown by the following examples: 'mak.ti *ghost*, ?i.ni.'nik.pa *he takes it*, 'ma.'ak.si *a while ago*, ci.'ci-mat *a proper name*.

The alveo-palatal phoneme y has never been observed to follow i in the same syllable.

3. Ambisyllabic clusters are limited chiefly in that alveolar phonemes have never been observed to occur following an alveo-palatal phoneme.⁹ Voiced stops, b, d, and dʷ are very limited in their combination with other consonants. d and dʷ have only been observed occurring in clus-

⁸ The majority of morphemes containing the vowel i causes palatalization of alveolars to alveo-palatals. This was also pointed out by Foster.

⁹ This is due to the phonological process of palatalization (assimilation) which causes alveolar sounds to become palatalized after alveo-palatal sounds.

ters with glottal stop as the initial member: to?.'di?y *having earthworms*, ?i.wi?.'dʷa?y *he wound it for him*. The voiced stop b occurs in clusters with glottal stop or y as the initial member: ha?.'bo?y.pa *he grinds*, ?ey.bik *again*.

The remaining voiced stop g has been observed to occur with all consonants except voiced stops and w, but only as the final member of the cluster.¹⁰ Examples are: nik.'gak.pa *he goes again*, 'ti?ŋguy *metal*, ho'y.'gak.pa *he takes a walk again*.

In clusters the glottal stop occurs only as the initial member.

3.1. Both open and close transition occur between syllables. Open transition has the following forms: (1) the aspiration of voiceless stops when not followed by a consonant phoneme of the same point of articulation (cf. Section 2.2 Syllable margins), and (2) the development of a lenis shwa vowel between nasals and certain other sounds. The two members of the cluster are at different points of articulation. This development occurs in the following clusters: np, nk, ng, nm; ñp, ñk, ñg, ñm; ŋp, ŋt, ŋtʷ, ŋc, ŋč, ŋs, ŋš, ŋm, ŋn, ŋñ, ŋy. Examples are: ?i.'pɛ?n.pa [?'i.'pɛ?n°.pa?] *he builds-a-nest*, 'miñ.pa [?'miñ°.pa?] *he comes*, ?iŋ.'ta?n [?'iŋ°.ta?n^N] *he fenced it (the house)*.

Close transition is the lack of development of any type of aspiration or shwa vowel. It occurs in the following instances: (1) When the first syllable ends in a vowel: 'pī.pa *it gets fat*. (2) Between syllables in which the final consonant of the first and the initial consonant of the second are the same point of articulation: ?ik.'ka? *he killed it*, pet.'ta.p *it is being swept*. (3) When the first syllable ends in a glottal stop, affricate, fricative, semi-vowel or m: 'tu?.'mī *brother*, 'mī.č.pa *he is playing*,

¹⁰ The frequent occurrence of the repetitive morpheme -gak is responsible for the wide distribution of the voiced stop g.

'hiks.kīy *fast*, 'ho'y.pa *he is angry*, mīm.'nɛ? *he is sick*. (4) When n is followed by h; ñ by h; ŋ by w or h: 'an.'ha.tuŋ *my father*, 'iñ.'hɛ.pɛ *your cup*, 'aŋ.'wɛh.pa *he shouts*, 'aŋ.'hɛh.pa *it smells foul*.

3.2. With the exception that syllables in utterance-final position containing as their nucleus a long vowel are stressed, stress is not phonologically conditioned, and is therefore phonemic. Some of the

word pairs that have been observed are: 'ʔaŋ.kīʔ *yard*, 'ʔaŋ.'kīʔ *my hand*; 'ʔiš.kuy.pīk *of the eye*, 'ʔiš.'kuy.pīk *eyebrow*; 'i.'wat.nas *his made thing*, 'i.wat.'nas *he did it first*.¹¹

¹¹ Few—if any—stress contrasts are seen between comparable morphemes. Stress differences develop, however, between sequences of morphemes. Leonard Bloomfield has pointed out a similar situation for English (*Language*, p. 90, New York, 1933). These differences in Popoluca stress cannot be handled by postulating junctures by which the stress might be conditioned.

