

Syllables, Tone, and Verb Paradigms

Studies in Chinantec Languages 4

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Studies in Chinantec Languages 4

William R. Merrifield and Calvin R. Rensch

Editors

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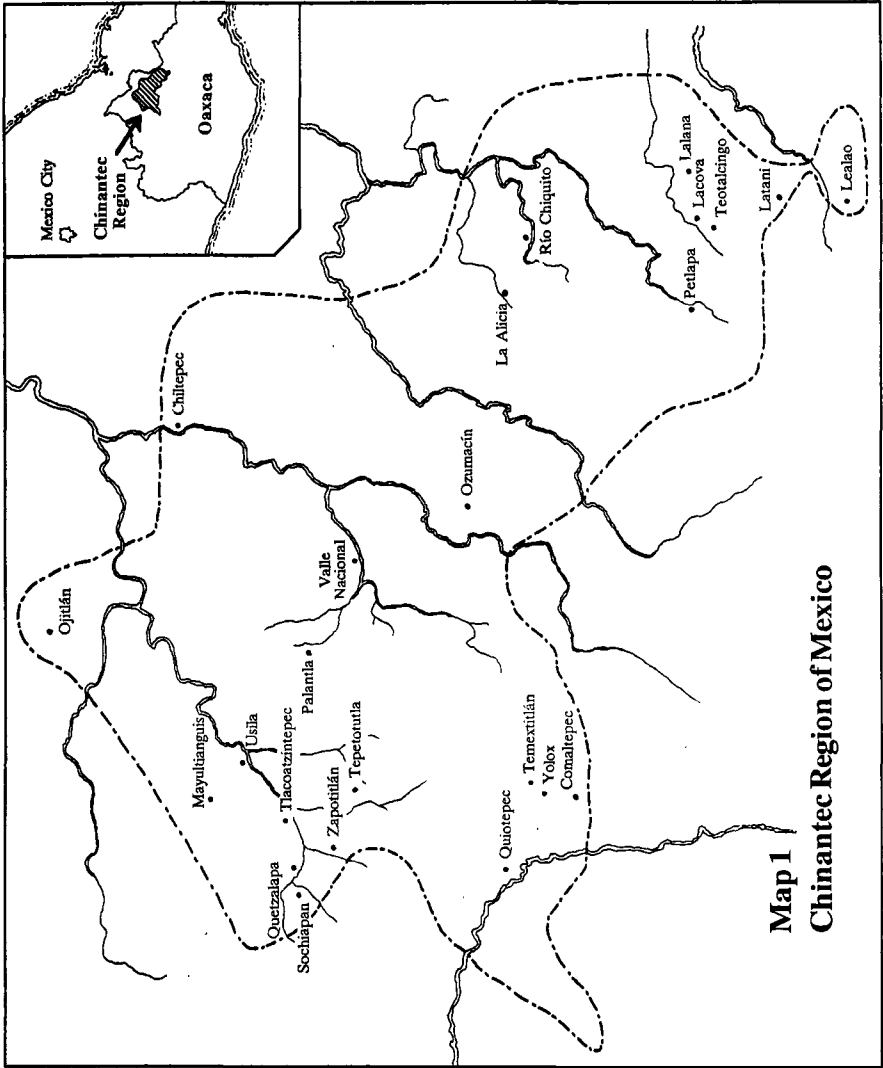
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Map 1
Chinantec Region of Mexico

Comaltepec Chinantec Tone

Judi Lynn Anderson, Isaac H. Martínez, and Wanda Pace

Those of us who have had the good fortune and privilege of living and working among the Chinantec people of Oaxaca, after years of study of their language, continue to be very much impressed by the subtle complexity of Chinantec phonology. The interplay of tone, stress, and vowel-length contrasts, patterns of tone sandhi, and complicated tone morphology present a formidable barrier to phonological analysis. This paper¹ attempts to unravel some of these complexities through a detailed discussion of the tone system as it relates to these other factors. After a brief introduction to the structure of the phonological word, the syllable is described, passing over the segments with a minimum of detail in favor of a more thorough discussion of tone, patterns of inflection for person-of-subject and person-of-possessor as they affect phonological structure and tone sandhi. The paper closes with a discussion of problems related to analytical choices the authors made.

¹The language described in this paper is spoken by the approximately 1000 residents of Santiago Comaltepec, Ixtlán de Juárez, Oaxaca, México. The data were collected by JLA and WP during extended field trips to Comaltepec from January 1970 to the present, under the auspices of the Summer Institute of Linguistics. IHM is a native of Comaltepec, and for several years served as principal language associate in the linguistic research of JLA and WP. Although bilingual in Spanish and Chinantec, he cannot be held responsible for errors in this statement. He has, nevertheless, been an indispensable member of the team that has produced it. Calvin R. Rensch gave extensive help in preliminary analysis at a linguistic workshop in the fall of 1970, and William R. Merrifield guided the final stages of analysis as well as the preparation of this paper. This help is gratefully acknowledged.

A Chinantec word consists of one or more syllables, only one of which is stressed—usually the last. The major lexical classes are usually realized as a single stressed syllable, but there are also a substantial number of complex verb and noun stems having a pretonic syllable as well. A handful of verbal prefixes and a few proclitic functors provide further sources for pretonic syllables. *hú:^H* ‘word’, *tē:^M* ‘I call’, *hmi^L-sĭ^{HL}* ‘cat’, *ka^L-hmi^L-hmi:^H* ‘I melted it’.

Grammatical inflection for person-of-subject (in verbs) or possessor (in nouns) is the source of a posttonic unstressed syllable in that pronouns occur in both a FULL form as stressed syllables and in a REDUCED unstressed form with limited segmental and tonal properties. *lá^{LM} hnä^{LH}* or *lá^{LM}a* ‘I buy it’, *bĭ^L hnä^{PH}* or *bĭ^Li?* ‘we throw it’.

There are two kinds of word stress, ballistic and controlled. A ballistic syllable (= syllable with ballistic stress) is characterized by a surge and rapid decay of intensity with a resultant fortis articulation of its consonantal onset and a tendency to loss of voicing resulting in a breathy release toward the end. A controlled syllable displays a more constant level of intensity throughout its duration and is typically longer than a ballistic syllable. Important for our consideration in this paper are tone characteristics which differ between ballistic and controlled syllables; details of these differences are presented in the body of the paper.

A ballistic syllable is marked by an acute accent /´/ over its nuclear vowel. A controlled syllable is unmarked (for the sake of simplifying the notation), but is distinguished from unstressed syllables in a controlled word of more than one syllable as the last syllable marked for contrastive tone.

1. Syllable constituents

The stressed syllable may have the following form: a consonantal onset, prenuclear /i/ or /u/, nuclear vowel, postnuclear nasal, glottal closure, final consonant, and tone. Only the nuclear vowel and tone must occur; other elements are optional. The nuclear vowel may be short or long, oral or nasal.

1.1. Consonantal onsets. Any of sixteen consonants may occur in the syllable onset: labials /p b m/, alveolars /t d c z s r l n/, velars /k g ŋ/, and laryngeals /ʔ h/; /c z/ are affricates [tš dʒ]; /r/ is a retroflexed palatal that varies between a spirant [ʒ] and a trill [ř]; and /h/ is a voiceless counterpart

of the segment it precedes. *pi*^{PH} ‘little (i)’,² *bë*^{PLH} ‘ball’, *mi*^H ‘plain’, *ti*^L ‘thin (i)’, *dó*^{LH} ‘maguey sap’, *cí*^H (term of endearment), *zi*^L ‘dog’, *so*^M ‘ascent’, *ro*^L ‘sweet’, *lo*^L ‘rabbit’, *nu*^L ‘grass’, *ki*^{LM} ‘garbage’, *gú*^{LH} ‘owl’, *ñú*^{LM} ‘meat’, *ʔo*^M ‘papaya’, *hi*^L ‘book’.

Laryngeal consonants may occur alone in the syllable onset, as indicated above, or may combine with /m n ŋ l g/ as the first member of a cluster. *ʔmi*^L ‘feces’, *hmi*^L ‘water’, *ʔni*^{LH} ‘rope’, *hniu*^L ‘green beans’, *ʔñión*^{PLM} ‘waist’, *hñan*^{PLMr} ‘he kills’, *ʔle*^L ‘dust’, *hlo*^{PH} ‘pretty’, *ʔgo*^L ‘elegant’, *hgo*^{PL} [x:o^{PL}] ‘rotten’.

Voiced stops /b d g/ are frequently prenasalized. Furthermore, they almost never occur before a nasal vowel, a fact which places them in almost complete complementation with /m n ŋ/, which always occur before a nasal vowel. The two known exceptions that create contrast are *bô*^M ‘corpulent’ and *gô*^L [ʃgô] (courtesy modal adverb). Cf. *mó*^{LM} [mô^{LM}] ‘century plant’ and *ñô*^M [ŋô^M] ‘went’.³

In words borrowed from Spanish, a few additional consonant clusters occur, such as those with /r/ as second member. In this context, /r/ is a flap. *irén*^{LH} ‘railroad train’, *drë*^M ‘Andrea’.

In a very few lexical items, syllables occur without a consonantal onset. *én*^{PLMr} ‘he feeds (him)’.

1.2. Nuclear vowels. Any of eight vowels may occur as the nucleus of a syllable peak: front unrounded /i e/, back unrounded /i ë/, back rounded /u o/, and low /ä a/. *lí*^H ‘flower’, *he*^{PLM} ‘frog’, *lí*^{PH} ‘circle’, *bë*^{PLH} ‘short’, *lu*^L ‘fly’, *ho*^{PLH} ‘maggot’, *zä*^L ‘person’, *ta*^{LH} ‘work’.

Any vowel may be short (as above), or long. *ti*^L ‘thin (i)’, *te*^L ‘white (i)’, *ii*^M ‘foot’, *rë*^L ‘smooth’, *ku*^M ‘money’, *ʔó*^H ‘rotten’, *tä*^{LH} ‘daddy’, *ha*^{nL} ‘one (a)’.

Any vowel may be oral (as above), and any except /ë/ may be nasal. *ʔí*^{LM} ‘stupid’, *ʔé*^{LHr} ‘his uncle’, *hí*^H ‘weasel’, *tú*^{PM} ‘you pour it’, *hmi*^{L-kô}^{PHM} ‘you help him’, *hmi*^{L-tä}^{LM} ‘Macuiltianguis’ (a town name), *kä*^M ‘I charge (money)’.

There is no contrast between oral and nasal vowels after nasal consonants in the syllable onset; all such vowels are phonetically nasal. With postnuclear nasals, the contrast between oral and nasal vowels is extremely marginal. Only a few words are known in which the vowels are

²Verbs (and adjectives) are inflected to agree with the gender of noun subjects or objects. (a) indicates animate gender, (i) inanimate.

³As indicated in these examples, since nasal consonants always precede nasalized vowels, we choose to leave the nasalization unmarked on such vowels in our phonemic notation. The \$ in the phonetic transcription indicates tone perturbation.

clearly nasalised. *ha:n^L* ‘one (a)’, *h̄a:n^L ʔi^{Lr}* ‘he awaits him’, *ʔi:n^L ʔi^{Lr}* ‘he sweats’, *ʔi:n^L* ‘thief’, *pin^{ʔH}* ‘small’ (a), *p̄in^H* ‘spotted (from Spanish pinto)’.

1.3. Prenuclear /i/ and /u/. Prenuclear /i/ may occur in syllables following any consonantal onset other than a bilabial or /r/, or without a consonantal onset, and may precede the long or short vowels /e a u o/, the back unrounded vowels /ī ɛ̄/, or low front /ä/.
 The sequence /ie/ is infrequent, being attested in few words and following only a limited number of consonants. *dié^{LH}* ‘god’ (from Spanish dios), *ʔie:^L* ‘sun’, *hie^{HM}* ‘where’.

A velar consonant is invariably followed by a nonsyllabic [i] in syllables with /i e/ as nuclear vowel. This is here treated as allophonic. *ki^{LM}* [k̄y^{LM}] ‘garbage’, *gé^M* [gyé^M] ‘seven’ (i), *ʔe^{ʔM}* [ʔjyɛ^{ʔM}] ‘father’.

The sequence /ia/ is in near complementary distribution with /ä/, there being contrast only after laryngeal consonants. After an alveolar or labial, only /ä/ is attested; after a velar consonant, only /ia/ is found. *h̄ä^{LM}* ‘spider’, *hiá^{LM}* ‘cliff’, *ʔán^{LM}* ‘very’, *ʔia^{LM}* ‘griddle’, *ʔiá:n^L* ‘it sprouts’, *b̄ä^{LM}* ‘bunch’, *ʔmä:^M* ‘I guard’, *t̄ä:n^L* ‘white (a)’, *ʔl̄á^L* ‘snare’, *n̄á^{LM}* ‘open!’, *kiá^{ʔMr}* ‘his’, *giá:n^M* ‘twenty (a)’, *ʔhiá^L* ‘five (i)’.

The sequence /iu/ is attested with all consonantal onsets with which prenuclear /i/ is known to occur. In this sequence, unless followed by the postnuclear nasal, /u/ is lowered and rounded to [ö]. *giú^M* [gyö^M] ‘good (i)’, *giún^M* [gyún^M] ‘good (a)’, *hiú^{LH}* [Iyö^{LH}] ‘a little bit’, *hiú:n^{LH}* [Iyú:n^{LH}] ‘child’.

Following an alveolar consonant, when preceding /u/ (without postnuclear nasal), the articulation of /i/ is reduced to its fronting and lowering effects on /u/ and to palatal backing of the consonant. *tiú^{LM}* [t̄iö^{LM}] ‘rifle’, *ciú^{ʔLMr}* [t̄šö^{ʔLMɛ̄}] ‘he kisses’, *siú:^{LH}* [š̄ö:^{LH}] ‘small deer’, *ʔliú^{ʔLM}* [ʔiö^{ʔLM}] ‘you lick’, *niú^{LM}* [ñiö^{LM}] ‘soap’.

The sequence /io/ occurs only before postnuclear nasal. After an alveolar consonant, which has a palatal backing in this context, /i/ is lowered to a quick glide [e]. *ka^L-sión^{LMr}* [ka^Lšeó^Liñ^M] ‘he got a desire for it’, *nión^{ʔLMR}* [neón^{ʔLMñ^H}] ‘night overtakes me’, *kio:n^M* [k̄io:n^M] ‘four (a)’, *h̄nió:n^{Mr}* [ñ̄īyó:iñ^M] ‘there are six of them (a)’.

Prenuclear /u/ may occur following any velar or laryngeal consonant other than /ŋ/, or without a consonantal onset, and may precede any vowel other than /u/. *kue:^L* ‘long (i)’, *guá^{ʔM}* ‘church building’, *huí:^L* ‘village’, *ʔuí^{ʔM}* ‘black (i)’, *guo:^L* ‘hand’, *huē^{ʔLM}* ‘fear’, *kuä^{LH}* ‘horse’, *guí:^M* ‘cold’, *ʔuí^{LM}* ‘dish’, *ʔue^{ʔL}* ‘hard’.

1.4. The postnuclear nasal. The nuclear vowel may be followed directly by a postnuclear nasal. Its occurrence is often associated with inflection for animate gender, but it also occurs in forms that appear to be morphologically simple. *pin*^{?H} ‘small (a)’, *giún*^M ‘good (a)’, *huín*^{LM} ‘many’, *gín*^{?LM} ‘swing’.

The postnuclear nasal varies in point of articulation from a labial to a velar according to context. It is (somewhat arbitrarily) here considered to be alveolar in its underlying form on the basis of the realization of a chameleon segment which follows it. Specifically, the first-person-singular personal pronoun (§2.1) has a reduced form which is chameleon, taking on the form of a preceding segment (other than /ʔ/). Following the postnuclear nasal, this chameleon is realized as an alveolar nasal. *ka^Lsin^{?LHR}* [ka^Lsin^{?LHŋ^L}] ‘I untied (him)’.

The postnuclear nasal is also alveolar preceding /n/ within the word, or preceding any alveolar consonant across a word boundary. *ka^Lhuén^{?LMne}* ‘the animal was frightened’, *hiú:n^{LH} ná:n^H* ‘yellow child’, *hiú:n^{LH} i:n^{HL}* ‘thin child’, *hiú:n^{LH} la^{HL}* ‘this child’, *hiú:n^{LH} rá:n^H* ‘conceited child’, *hiú:n^{LH} ze^{?HM}* ‘sick child’.

Preceding a labial consonant, within the word or across a word boundary, the postnuclear nasal is labial. *pin^{?Hb}* [pim^{?H}] ‘he is TINY’, *hiú:n^{LHb}* [lyú:m^{LH}] ‘it’s a CHILD’, *hiú:n^{LH} pin^{?H}* [lyú:m^{LH} piŋ^{?H}] ‘small child’.

Preceding a velar or laryngeal consonant, or pause, the postnuclear nasal is velar. *hiú:n^{LH} kën^{?HM}* [lyú:ŋ^{LH} kēŋ^{?HM}] ‘big children’, *hiú:n^{LH} gi:n^H* [lyú:ŋ^{LH} gyi:ŋ^H] ‘angry child’, *hiú:n^{LH} ?uín^{?H}* [lyú:ŋ^{LH} ?wíŋ^{?H}] ‘black child’, *hiú:n^{LH} ?í^{?LM}* ‘stupid child’, *hiú:n^{LH} han^{?HM}* [lyú:ŋ^H Aaŋ^{?HM}] ‘perverse child’.

Preceding /t/ within a word, the postnuclear nasal assimilates the /t/ and actualizes as a fronted velar with a nonsyllabic high front vocoid onglide. *ní^Lhlén^{Mr}* [nɪ^LLléiŋ^M] ‘he will tremble’, *?éñ^{LMr}* [ʔéiŋ^{LM}] ‘he pulls (him)’, *na:n^{Lr}* [nə:iŋ^L] ‘he begins’, *ní^Lmín^{?Mr}* [nɪ^Lmíiŋ^{?M}] ‘he will pinch (him)’, *?ñión^{?Lr}* [ʔñiŋiŋ^{?L}] ‘he ties (him) up’.

1.5. Glottal closure. A syllable may be open or checked by /ʔ/ without significant distributional limitations with other segmental elements. *hú^H* ‘mosquito’, *hú^{?H}* ‘pineapple’, *ta^{LH}* ‘work’, *ta^{?LM}* ‘honey’.

1.6. Final consonants. Phonologically reduced forms of morphemes are the source of two syllable-final consonants, /r b/. They are phonetically the final elements of stressed syllables, but are grammatically enclitic forms of morphemes which follow the morpheme represented by the stressed

syllable. Attention is here drawn to their morphological status by placing them after the tone notation of the stressed syllable in the phonological representation.

/r/ is a reduced form of the third-person personal pronoun. *ʔiá^Lr* ‘her griddle’, *sĭ^{ʔH}r* ‘his clothing’.

/b/ is a reduced form of the modal adverb *bá^{ʔH}* (affirmation). *să^Lb* *kui:^L* ‘there is corn’. It allows a noun to function as a predicate. *kuă^{LHb}* ‘it’s a horse’. Syllable-final /b/ is devoiced in the absence of a preceding postnuclear nasal; following such a nasal, it is assimilated into the latter, which is realized as a labial. (It might be as well to consider this a /p/ to begin with, but it is tentatively treated as /b/ because of its relationship to *bá^{ʔH}*. In first attempts at writing Chinantec, native writers used /b/ for this form.) *hi^Lb* [lip] ‘it’s a BOOK’, *pi^{ʔH}b* [pi^ʔp^H] ‘it’s LITTLE’, *món^{LHb}* [móm^{MH}], it’s Raymond’, *iún^{ʔLMb}* *ză^Lmĭ:^L* [iúm^{ʔLM} dză^Lmĭ:^L] ‘the woman is OLD’.

/s l/ occur as the final consonant of a syllable in just one word each. /s/ occurs in *huĭs^H* ‘really’, which is likely a phonological and semantic adaptation from Spanish *pues* or *pues sí* ‘indeed’. /l/ occurs only in *hial^{HM}* ‘how?’. The cognates of this word in other Chinantec languages show, however, that it has its source in two syllables, the second of which had /l/ as its consonantal onset (cf. Quiotepec *hiá:^{LH}la^L*, Palantla *ʔa^Mla^ʔ*).

1.7. Tone. Because of the interplay of tone with stress and other elements of the syllable, it is convenient to speak of eight types of syllable: the class product of ballistic/controlled, long/short, and open/checked contrasts. With this clarification, the tones may be introduced.

A stressed syllable may occur (1) with any of three simple tones: low /^L/, mid /^M/, or high /^H/; or (2) with any of four tone sequences: two upglides (low-mid /^{LM}/ or low-high /^{LH}/) and two downglides (high-mid /^{HM}/ or high-low /^{HL}/).

Low tone is a low descending tone in all syllable types, with the lowering in pitch being greater in ballistic syllables than in controlled. A long open ballistic syllable with this tone has a slight upglide after the more pronounced downglide. *hi^L* ‘book’, *lă^L* ‘snare’, *hmo:^L* ‘grass mat’, *kĭ:^L* ‘candle’, *hi^{ʔL}* ‘orange’, *hó^{ʔL}* ‘animal’, *hi:^{ʔL}* ‘you plow’, *kui:^{ʔL}* ‘you are acquainted with it’.

Mid tone is a mid level tone of about the same height regardless of syllable type. *mĭ:^M* ‘ask (1s)’, *ʔuĕ^M* ‘dirt’, *ziu:^M* ‘earthen jar’, *gĭ:^M* ‘hot’, *ka^Lguăn^{ʔM}* ‘you arrived home’, *guă^{ʔM}* ‘church building’, *kă:^{ʔM}* ‘we charge (money)’, *ka^Lhi:^{ʔM}* ‘you plowed’.

High tone is a high level tone of about the same height regardless of syllable type. *lʰ^H* ‘flower’, *húː^H* ‘word’, *hloʔ^H* ‘pretty’, *húː^{PH}* ‘pineapple’, *niː^Lhiːː^{PH}* ‘you will plow’.

A low-mid tone glide begins low and rises only slightly in pitch, the rise being greater in ballistic syllables than in controlled. An open ballistic syllable with this glide is longer in duration than its controlled counterpart. *kiː^{LM}* ‘garbage’, *ŋiː^{LM}* ‘pig’, *hmiː^{LM}* ‘tomato’, *ginː^{LM}* ‘swing’.

A low-high tone glide begins low and rises sharply, except on a long ballistic syllable where its phonetic characteristics are somewhat unusual. In this context, it begins low and descends sharply before changing direction to rise to a point slightly above that of a mid tone. Though the writers usually perceive the downglide portion of the tone as more prominent, native speakers (including IHM) appear to perceive the tone as an upglide. Syllables are longer than corresponding syllables with other tones, except in open controlled syllables. *liː^{LH}* ‘tepejilote palm shoot’, *ló^{LH}* ‘prickly pear cactus’, *hiːː^{LH}* ‘edible tuber’, *bě^{LH}* ‘short’, *kaː^Lsiːː^{PH}* ‘you sharpened to a point (as in pencil)’.

A high-mid tone glide is a short, shallow glide. In short syllables it rises slightly; in long syllables it falls slightly. In each case, the higher part of the glide approximates the level of high tone, while the lower part is at or slightly above that of mid tone. (Arguments for joining these different glides are given in §4.) *teː^Lgua^{HM}* ‘earrings’, *niːː^Lʔeː^{HM}* ‘tumpline’, *hmiːː^Lʔoːː^{HM}* ‘soot’, *ziːː^Lmóːː^{HM}* ‘flea’, *ʔmeːː^Lheːː^{PHM}* ‘basket with tumpline’, *siːː^Lhuːːː^{nPHM}* ‘you pile it up’, *hmiːː^Lʔiːːː^{PHM}* ‘you take a lot of time to do it’.

A high-low tone glide begins at the level of a high tone and falls rapidly to a point below that of mid tone. *hiːː^Lhmiːː^{HL}* ‘onion’, *hiːː^Lböːː^{HL}* ‘potato’, *ʔmaːː^Lkíːː^{HL}* ‘pine tree’, *siːː^Lniːː^{PHL}* ‘grasshopper’, *miːː^Lhuːːː^{PHL}* ‘cockroach’, *hmiːː^Lgóːːː^{PHL}* ‘you deceive’.

2. Person inflection

Inflection for person-of-subject or person-of-possessor affects phonological patterning. Reduced forms of personal pronouns are the source of both posttonic syllables and long checked syllables. Each of the personal pronouns will now be discussed.

2.1. First-person singular. The full form of the first-person singular personal pronoun is *hnä^{LH}* ‘I’. *huː^{LM} hnä^{LH}* ‘I chew’. In reduced form, it is a syllabic chameleon posttonic segment /r/ (= reduplication). Following a syllable with postnuclear nasal, /r/ is a syllabic nasal. In this context, the postnuclear nasal is elided except in a checked syllable, where elision is

optional. $ni^L\dot{r}i:n^LHR$ [$n\dot{i}^L\dot{r}i:L^H\eta^L$] ‘I will sweat’, ka^Lkian^PMR [$ka^Lk\dot{y}an^?M\eta^L$] ~ [$ka^Lk\dot{y}a^?M\eta^L$] ‘I slept’.

Following a syllable without postnuclear nasal, /r/ takes on the quality of the preceding nuclear vowel. (The tonal properties of /r/ and other posttonic syllables are predictable. This is discussed in §3.2.) $hmi^L\eta i^?HMR$ [$Mm\dot{i}^L\eta i^?HM\dot{i}^H$] ‘I ask (him)’, $zi^?LMR$ [$dzi^?LH\dot{i}^L$] ‘I will terminate’.

The characteristic voiceless breathiness on an open ballistic syllable is particularly prominent in the transition to /r/. $ka^Lnó^MR$ [$ka^L?n\acute{o}^MQ\acute{o}^L$] ‘I got it’.

After the nuclear vowel /ä/, /r/ is [a], which suggests that /ä/ is derivationally related in some way to /ia/ with which it is only marginally in contrast. $ni^Lb\acute{a}^HR$ [$n\dot{i}^Lb\acute{a}^HAa^L$] ‘I will roll’. But cf. $\dot{r}i\ddot{u}^?MR$ [$?i\acute{o}^?M\acute{o}^M$] ‘I lick’.

/r/ is the source of certain derived syllables as follows: After a controlled open syllable with tone /^M HM/, /r/ is assimilated into the stressed syllable rather than following it as a separate posttonic entity. In the case of a BASIC short syllable, the addition of /r/ results in a long syllable. In the case of a BASIC long syllable, the expected added mora is elided.

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|-----|-------------------------------|---|------------------------------|-----------------|
| (1) | $m\ddot{i}^MR$ | → | $m\dot{i}^:M$ | ‘I ask’ |
| | ηi^HMR | → | $\eta\dot{i}^:HM$ | ‘I know’ |
| | $\eta\dot{i}^:MR$ | → | $\eta\ddot{i}^:M$ | ‘I answer’ |
| | $s\ddot{i}^Lhu\ddot{i}:n^HMR$ | → | $s\ddot{i}^Lhu\ddot{i}:n^HM$ | ‘I stack it up’ |

2.2. First-person plural. The full form of the first-person plural exclusive personal pronoun is $hn\acute{a}^?H$ ‘we (x)’. $\dot{r}l\acute{e}:LH$ $hn\acute{a}^?H$ ‘we (x) spoil it’. It has two reduced forms with partially overlapping distributions. It may be $na^?$ after any syllable; it may be $R^?$ after any syllable that has no postnuclear nasal. $ni^Ll\acute{a}^HA^?$ [$n\dot{i}^Ll\acute{a}^HAa^?$] or $ni^Ll\acute{a}^Hna^?$ [$n\dot{i}^Ll\acute{a}^Hn\acute{a}^?$] ‘we will buy it’, $ni^L\dot{r}\acute{e}n^Hna^?$ [$n\dot{i}^L\dot{r}\acute{e}n^Hn\acute{a}^?$] ‘we will criticize (him)’, $hmi^Lk\acute{o}^?HMR^?$ [$Mm\dot{i}^Lk\acute{o}^?HM\acute{o}^?H$] or $hmi^Lk\acute{o}^?HMRna^?[H]$ ‘we help’, $hg\acute{o}^?M\acute{o}^?[M]$ or $hg\acute{o}^?Mna^?[M]$ ‘we choke on it’.

After controlled open syllables with tone /^M HM/, $R^?$ is assimilated into the preceding stressed syllable, thereby giving rise to derived long controlled checked syllables with these tones. As mentioned, these two syllables are always derived, not being attested to as the realization of single morphemes without remainder.

- | | | | | |
|-----|-------------------|---|------------------|-------------|
| (2) | $k\acute{a}^MR^?$ | → | $k\acute{a}:^?M$ | ‘we charge’ |
| | $h\dot{i}:^MR^?$ | → | $h\dot{i}:^?M$ | ‘we plow’ |

<i>ne^{HM}_R?</i>	→	<i>ne:ʔ^{HM}</i>	‘we see’
<i>hmi^Lŋi:^{HM}_R?</i>	→	<i>hmi^Lŋi:^{ʔHM}</i>	‘we ask’

There is also a full form of a first-person plural inclusive personal pronoun. It is a long ballistic variant of the first singular pronoun with the nonnasal reduced form of the first-person plural exclusive pronoun as posttonic syllables: *hná:^{LH}_R?* ‘we (i)’.⁴ There are no separate reduced forms of this pronoun; reduced exclusive forms are used with either inclusive or exclusive meaning.

There are a few verbs which seem always to have a postnuclear nasal when occurring with the full form of the first-person pronoun, but which may optionally occur without the nasal with a reduced form. *si^Ltín^{HM} hnä^{ʔH}* ‘we will gather them’, but also *si^Mtí^{HM}[ĩ]ʔ[L]* or *si^Ltín^{HM}naʔ[L]*.

2.3. Second-person singular. The full form of the second-person singular personal pronoun is *ʔniu^L* ‘you’, and its reduced form is /ʔ/ which further reduces to \emptyset following a checked syllable. Since final glottal is a normal feature of syllables, this reduced form of the pronoun does not result in a posttonic syllable, but rather is the source of derived checked syllables when the basic syllable to which it is added is open. This is in fact the only source, along with *Rʔ* ‘we’, of long checked syllables.

(3)	<i>ni^Lhi:^H?</i>	→	<i>ni^Lhi:^{ʔH}</i>	‘you will plow’
	<i>ka^Lti:^M?</i>	→	<i>ka^Lti:^{ʔM}</i>	‘you scratched it’
	<i>ka^Lhi:^M?</i>	→	<i>ka^Lhi:^{ʔM}</i>	‘you plowed’
	<i>kie:^L?</i>	→	<i>kie:^{ʔL}</i>	‘you lay them down’
	<i>ʔi:^{nL}?</i>	→	<i>ʔiⁿʔ^L</i>	‘you sweat’
	<i>hé:^{nLH}?</i>	→	<i>hé:^{nʔLH}</i>	‘you look at (him)’
	<i>si^Lhuü:^{nHM}?</i>	→	<i>si^Lhuü:^{nʔHM}</i>	‘you stacked them’
	<i>ka^Llú:^{HM}?</i>	→	<i>ka^Llú:^{ʔHM}</i>	‘behind you’
	<i>hmi^Lgó:^{HL}?</i>	→	<i>hmi^Lgó:^{ʔHL}</i>	‘you deceive’

There is an unexpected loss of ballistic stress in a short ballistic open syllable with tone glides /^{LM} LH HM/ when the syllable becomes checked by second person inflection. In the case of /^{LH} HM/, this anomaly is partially explained by the lack of a corresponding short ballistic checked syllable with /^{LH} HM/ in the system. In the case of /^{LM}/, a corresponding short

⁴Note that in another context, (i) is also used to designate inanimate gender.

ballistic checked syllable is attested, but its status as a truly basic syllable is marginal in that only a very few simple lexical items are found with this form.⁵

- | | | | | |
|-----|--|---|--|-------------------|
| (4) | <i>ka^Lŋiú^{LM}ʔ</i> | → | <i>ka^Lŋiu^{ʔLM}</i> | ‘you vomited’ |
| | <i>ni^Lhú^{LH}</i> | → | <i>ni^Lhu^{ʔLH}</i> | ‘you will go out’ |
| | <i>si^Ltĩn^{HM}ʔ</i> | → | <i>si^Ltĩn^{ʔHM}</i> | ‘you gather’ |

When second person /ʔ/ is added to a short open syllable with a simple tone /^{L M H}/, it retains its expected stress pattern and merges with the corresponding checked syllable.

- | | | | | |
|-----|---|---|--|------------------|
| (5) | <i>ni^Luí^Hʔ</i> | → | <i>ni^Luí^{ʔH}</i> | ‘you will go up’ |
| | <i>hmi^Lkiú^{ʔH}ʔ</i> | → | <i>hmi^Lkiú^{ʔH}</i> | ‘you dry it’ |
| | <i>ʔné^Mʔ</i> | → | <i>ʔné^{ʔM}</i> | ‘you need it’ |
| | <i>ka^Lzâ^Mʔ</i> | → | <i>ka^Lzâ^{ʔM}</i> | ‘you used it up’ |
| | <i>hĩ^Lʔ</i> | → | <i>hĩ^{ʔL}</i> | ‘you burn it’ |
| | <i>ni^{ʔL}ʔ</i> | → | <i>ni^{ʔL}</i> | ‘you swallow it’ |
| | <i>ŋiú^Lʔ</i> | → | <i>ŋiú^{ʔL}</i> | ‘you vomit’ |
| | <i>hú^{ʔL}ʔ</i> | → | <i>hú^{ʔL}</i> | ‘you cough’ |

The second-person plural pronoun has two full forms, *ʔniú^{ʔL}* and *ná^{ʔL}* ‘you (pl)’. *ná^{LM} ʔniú^{ʔL}* or *ná^{LM} ná^{ʔL}* ‘you (pl) open’. There are no separate reduced forms of this pronoun.⁶

2.4. Third-person. The full form of the third-person personal pronoun is *ʔi^Lr* ‘s/he/they’. *hmi^Lguän^{ʔL} ʔi^Lr* ‘s/he/they bless(es) (him)’. Its reduced form is /r/ which is phonologically assimilated into the preceding stressed syllable without affecting tone, stress, length, or glottal closure, but which is written in this study as enclitic, by placement after the tone notation of the stressed syllable, in accordance with its grammatical structure. *ha^Lr* ‘he comes’, *hmi^Lʔi^Hr* ‘he counts them’, *ŋi^Mr* ‘he laughs’, *ʔŋiu^{ʔLM}r* ‘he ties it up’, *ka^Lkĩ^{ʔL}r* ‘he wrapped it’.

⁵Another related matter is the fact that no second person verb is ever realized by a BASIC short controlled open syllable with a tone glide.

⁶For a revised analysis of the second-person plural pronoun, published earlier but postdating this one in writing by more than a decade, see Anderson 1989.

2.5. Animal. There is a third-person pronoun for designating animals the full form of which is $?i^L r\acute{i}^?M$. It has two phonologically reduced, enclitic forms which are the source of posttonic syllables: $-ne^?$ following a syllable with a postnuclear nasal, and $-ri^?$ following a syllable without a postnuclear nasal. Some speakers pronounce the latter form with /e/, but IHM insists it has an /i/. $ka^L ?i: n^M ne^?$ ‘the animal flew’, $ka^L u: ^M ri^?$ ‘the animal defecated’.

3. Tone sandhi

There are two types of tone sandhi, one that operates across any word boundary,⁷ and one that operates only between a stressed syllable and a following pronoun. These two types will be referred to as type one and type two respectively.

3.1. Type one sandhi. In type one sandhi, the following tones change after a change-inducing syllable:

- (6) $/L/ \rightarrow /HL/$,
 $/LH/ \rightarrow /HM/$, and
 $/M/ \rightarrow /H/$ in a ballistic syllable, but
 $/HM/$ in a long controlled syllable.

(The sandhi properties of a short controlled syllable are not known since lexical and syntactic limitations make it inappropriate for it to occur after a change-inducing syllable.)

Tone glides $/HL^H M/$ are seen to be derived by type one sandhi: tones $/L^M H^L M^L H/$ may be considered basic.⁸ Of the basic tones, only $/L^M H/$ are never changed in a change-inducing context.

There are four change-inducing contexts:

⁷It appears necessary to posit another phonological unit—say, a rhythm group—across whose boundary sandhi does not occur. Within this group, type one sandhi operates across word boundaries between such grammatical material as the elements of a noun phrase, a verb and its (following) subject, or subject and following object of the same verb. When a subject or object NP is topicalized and transported to the left of its verb to topicalize it, however, it no longer causes sandhi in the verb following. This kind of limitation on sandhi requires further study.

⁸In bisyllabic nouns the derivation is opaque, giving rise to contrast between a derived tone and its source. $\acute{i}^L lo^L$ ‘bag’, $he^L nu: ^{HL}$ ‘ranch’, $la^L ta^{LH}$ ‘always’, $?ma^L u^{HM}$ ‘cane’.

(7) A preceding posttonic syllable.

<i>kí:L</i>	→	<i>ni^Llá^H_R kí:HL</i>	‘I will buy candles.’
<i>li:LH</i>	→	<i>hu^Lli^M_R li^{HM}</i>	‘I chew palm shoots.’
<i>gé:M</i>	→	<i>ka^Lkian^M_R gé:H</i>	‘I slept yesterday.’
<i>ku:M</i>	→	<i>ka^Lmi^M_R ku:HM</i>	‘I asked for money.’

(8) A preceding controlled syllable with /^M/.

<i>rë:L</i>	→	<i>so:M rë:HL</i>	‘smooth ascent’
<i>hnäLH</i>	→	<i>mi^M hnä^{HM}</i>	‘I ask for it.’
<i>kiá^M_r</i>	→	<i>mi^M kiá^H_r</i>	‘I ask for his.’
<i>ziu:M</i>	→	<i>mi^M ziu:HM</i>	‘I ask for the jar.’

(9) A preceding syllable with tone /^H/ that is not both short and ballistic.

<i>ʔién^L</i>	→	<i>hiú:n^{LH} ʔién^H_L</i>	‘pretty child’
<i>ʔηa^{LH}</i>	→	<i>hé:L^H ʔηa^{HM}</i>	‘in the forest’
<i>bó^M</i>	→	<i>hmi^{LH} bó^H</i>	‘fat skunk’
<i>ziu:M</i>	→	<i>gua^{LH} ziu:HM</i>	‘jar’s handle’

(10) A preceding syllable with tone /^{HM}/ that is not both short and ballistic.

<i>hiá:n^L</i>	→	<i>ʔme^Lhe^M_r hiá:n^{HL}</i>	‘cheap basket’
<i>bě^{LH}</i>	→	<i>ʔma^Lʔu^{HM} bě^H_r</i>	‘short cane’
<i>té^M</i>	→	<i>hmi^Lʔo^M_r té^H</i>	‘sticky soot’
<i>ʔui:n^M</i>	→	<i>ka^Lliú^M_r ʔui:n^{HM}</i>	‘outside Ojtlán’

Since all syllables with /^{HM}/ may be considered to be derived from either /^{LH}/ or from /^M/ in a long controlled syllable by type one sandhi, a (10) context is nothing more than a (8) or a (9) context which is itself in a change-inducing context.

Syllables which do *not* cause type one sandhi, then, are those with tones /^{L H LM HL}/ or any short ballistic syllable. Neither do long checked syllables cause sandhi, but this is a matter of secondary factors—all such syllables are morphemically complex, and include a final morpheme whose

underlying form is not change-inducing by the above patterns. $hi:M hnä?^H \rightarrow hi:M + R? \rightarrow hi:??^M$ ‘we plow’.

A reduced set of only three level tones /^L M H/ are found in pretonic syllables. Of these, /^L/ \rightarrow /^H/ in change-inducing contexts.

- (11) $?mi^Lki?^{LM} \rightarrow hmo?^{LM}R? ?mi^Hki?^{LM}$ ‘We iron shirts.’
 $te^Lgua^{HM} \rightarrow kua^{LH} te^Hgua^{HM}$ ‘Give the earrings.’

3.2. Type two sandhi. Type two sandhi operates between a stressed syllable and a following pronoun in both full and reduced form, but in different ways. The reduced form will be discussed first.

Of the various pronouns, only first person pronouns and the animal pronoun are the sources of syllabic (posttonic) material in their reduced forms. It is therefore only these that are involved in this kind of type two sandhi.

After certain types of syllables, these pronouns take on the tone level of the immediately preceding tone.

(1) This is true following any short ballistic checked syllable with tone /^LM H/. $ni^Lniön?^{LH}R[?^H]$ ‘night will overtake me’, $ni^Lbé?^{HR}[?^H]$ ‘I will roll it up’, $ni^Lziá?^Ha?^{[H]}$ ‘we will go home’, $ka^Lhuén?^{LM}ne?[?^M]$ ‘the animal was frightened’.

(2) It is also true of an arbitrary subset of short, ballistic checked syllables with tone /^M/. Compare the following, in which one of the stems (presumably the first) must be marked to cause this kind of sandhi— $ka^Lbé?^{MR}$ [ka^Lbé[?]Me^M] ‘I rolled it up’, $ka^Ltá?^{MR}$ [ka^Ltá[?]Má^L] ‘I applied (liquid)’.

(3) It is further true of all controlled open syllables with tone /^M HM/. The pronunciation of /r/ with the same level tone as that of the preceding tone, facilitates the assimilation of /r/ into them as has been described in §§2.1-2. $si:^M_R \rightarrow si:^M$ ‘my name is’, $?uë:^M_R? \rightarrow ?uë:^M_e?$ ‘we go out’. One might expect this same derivational pattern to exist with other tones in controlled open syllables, but as it turns out, first person inflection is limited to tones /^M HM/ in such syllables, so that it is not possible to say for sure what might happen there.

The remaining syllable types fall into the same change-inducing and nonchange-inducing sets as in type one sandhi. The posttonic form of the pronouns have a high level tone after a change-inducing syllable, but a level low tone after a nonchange-inducing syllable. $ni^Lniú:^{LM}R[?^H]$ ‘I will hear it’, $hu?^{LM}R[?^L]$ ‘I chew’, $ku?^{LR}[?^L]$ ‘we sneeze’, $ka^Lhón^Mne?[?^L]$ ‘the animal died’.

Following a checked syllable with tone /^{LH}/, the glide is broken into two level tones separated by the glottal. *ni^L-hui^{?LH_R}* [nɪ^Lfi^{?L_iH}] ‘I will whistle (to him)’.

Of the various syllables that participate in type two sandhi, all cause the full form of the first-person singular personal pronoun to change to *hnä^{HM}* by type one sandhi except the marked subset of short ballistic checked syllables with tone /^M/ . After such a syllable, *hnä^{LH}* is changed to *hnä^M*. *ni^L-bé^{?H} hnä^{HM}* ‘I will roll it up’, *ka^L-bé^{?M} hnä^M* ‘I rolled it up’, *nión^{?LM} hnä^M* ‘night overtakes me’, *mi^M hnä^{HM}* ‘I ask’, *?ie:n^M hnä^{HM}* ‘I break out (in a rash)’.

4. Discussion

Behind the foregoing description of tone and tone sandhi there lies distributional and phonetic asymmetry which must be discussed if a true picture of Comaltepec Chinantec tone is to be given.

In the first place, the analysis reveals clearly that certain tones may be considered basic and others derived. Taking into consideration the eight kinds of syllables and seven tone configurations (three levels and four glides), there are fifty-six potential combinations of tone and syllable type. Of these, all but ten are attested; but, more significantly, only twenty-two are known to occur as the realization of a single morpheme. None of the twenty-two has a tone downglide or is both long and checked. The long checked syllables are seen to be the result of inflection for person, while the downglides derive from patterns of tone sandhi. A BASIC syllable has a single tone or an upglide, and is either open, or both short and checked (see figure 1).

Not all thirty of the potentially basic combinations are attested. Those not found in the data are

- (a) open controlled with /^H/,
- (b) long with /^{LM}/, and
- (c) long controlled open with /^{LH}/, and
- (d) short ballistic checked with /^{LH}/.

Furthermore, not every instance of a potentially basic syllable is the realization of a single complete morpheme. Specifically, though a long open controlled syllable with mid tone is BASIC in the case of *ziu:^M* ‘earthen jar’, it is DERIVED in the case of *ga:^M* ‘I come’. Similarly, any checked syllable may be derived from second person inflection.

Figure 1. Comaltepec Tone.

	CV	CV̇	CV	CV̇	CV?	CV̇?	CV?	CV̇?	CV?	CV̇?
H		BASIC M→H		BASIC M→H	CV̇?	CV̇?	BASIC?	CV̇?	CV̇?	CV̇?
M	*2nd	BASIC	CV-R CV-R BASIC?	BASIC	CV̇?	CV̇?	BASIC?	CV̇?	CV̇-R? CV̇-R? CV̇-R?	M→H CV̇?
L	*1st BASIC	BASIC	*1st BASIC	BASIC	CV̇?	CV̇?	BASIC	CV̇?	CV̇?	CV̇?
LM	*1st *2nd BASIC	BASIC			CV̇?	CV̇?	BASIC?	CV̇?		
LH	*1st *2nd BASIC	BASIC		BASIC	CV̇?	CV̇?	BASIC			CV̇?
HM	*2nd LH→HM	LH→HM	CV-R CV-R M→HM	LH→HM	CV̇?	CV̇?	BASIC	CV̇-R? CV̇-R? CV̇-R? M→HM	CV̇-R? CV̇-R? CV̇-R? LH→HM	CV̇-R? LH→HM
HL	*1st *2nd L→HL	*1st *2nd L→HL	*1st *2nd L→HL	L→HL	CV̇?	CV̇?	BASIC	CV̇?	L→HL	CV̇-R? L→HL

The following information is presented in figure 1: (a) unattested syllables (shaded) (b) BASIC syllables (with problematic ones indicated by question mark), (c) derived syllables (i) by sandhi (LH→HM), (ii) by addition of pronominal endings (-?, -R or -R?), and (d) unattested person inflection (*1st, 2nd).

Of the basic tones, /^L/ would appear to be most stable and free from problems of interpretation. It occurs as the realization of a large number of single complete morphemes in each of the six BASIC syllable types, and it appears with the normal phonetic properties one would expect with each of the combinations of length, stress, and glottal. Furthermore, it uniformly changes to the corresponding syllable pattern with tone /^H/ when placed in a tone change-inducing context, and uniformly never itself serves as such a context.

Passing to tones /^M ^H/: only in ballistic syllables are they stable and free from problems of interpretation. There are many examples of ballistic syllables, all having the expected normal phonetic properties and uniform patterns as regards sandhi—none induce change in a following syllable in type one sandhi—and syllables of this type with mid tone /^M/ are uniformly changed to /^H/ in change-inducing contexts.

Of the four types of controlled syllable, only a short checked one is attested with high tone /^H/ . Single morphemes that are realized by this syllable are few in number, being limited to a handful of nouns and adjectives whose historical source appears to be a corresponding short ballistic syllable, and to verbs inflected for second person subject.

A short controlled syllable with mid tone is always the realization of a first person verb. Though a long controlled syllable with mid tone may be the realization of one of a few simple morphemes, it is anomalous in changing to /^{HM}/ in a change-inducing context, rather than to /^H/ as its ballistic counterpart does. The fact that no long controlled syllable with /^H/ is attested is very likely related to this anomalous sandhi pattern. Controlled syllables with /^M/ are also anomalous in inducing change of tone in a following syllable while ballistic syllables with /^M/ do not.

Uplides occur as single morphemes and are clearly basic, but they have some unexpected phonetic characteristics and limited distribution over syllable types that present problems for interpretation.

As mentioned above, the phonetic characteristics of a long ballistic syllable with /^{LH}/ are anomalous in having a sharp change of direction from a falling to a rising tone. It is grouped as a /^{LH}/ on the basis of the fact that it changes to the corresponding (long ballistic) syllable with /^{HM}/ as other syllables with /^{LH}/ do. It is apparently also the modern reflex of an old long low-high glide. Except in an open controlled syllable, a /^{LH}/ glide is longer in duration than a single tone in a corresponding syllable type. The glide /^{LH}/ is not attested in a long controlled or short ballistic checked syllable.

Uplide /^{LM}/ occurs only in short syllables, although what has been treated as a short ballistic open syllable with this tone is unexpectedly long

and could be considered a long syllable. The comparative picture suggests that old long and short ballistic syllables with low-mid glide have merged in Comaltepec Chinantec. On the other hand, although atypically long for a short ballistic syllable, the corresponding syllable with /^{LH}/ is also longer than expected, and it appears that the analysis of verb tone conjugations will be simplified by considering it a short syllable. To consider it a long syllable would result in changing several other aspects of the analysis. The corresponding /^{LH}/ syllable would also have to be long, as would the corresponding /^{HM}/ syllable to which /^{LH}/ changes. These reinterpretations would, in turn, affect ballistic syllables with /^{LH}/ and /^{HM}/ which are presently considered long, and would very likely force the addition of two additional tone glides to the inventory, each with very limited distribution over syllable types. Such an alternative does not seem felicitous and so has been rejected, even though there are some phonetic facts which support it.

The syllables here analyzed as /^{HM}/ are not a phonetically homogeneous group. Short syllables with this tone are very shallow upglides, while long syllables are downglides. As here analyzed, however, they distribute well across syllable types, and line up well with corresponding syllables which change to /^{HM}/.

A further fact that argues for combining the short upglides with the long downglides as the same tone is that when a short controlled open syllable with this glide receives an extra mora by the addition of the reduced form of the first-person pronoun, it becomes a long downglide of the expected type. *ni^Lmi^{HM} hnä^{LH}* or *ni^Lmi^{HM}* 'I will ask for it', *ni^Lne^{HM} hnä^H* or *ni^Lne^H* 'we will see it'.

The /^{HM}/ glide does not occur as the realization of a single morpheme except when that morpheme occurs in a change-inducing environment.⁹ It does occur, however, as the stressed syllable of bisyllabic morphemes. Though such nouns never change form in modern Comaltepec Chinantec, it is presumed that they represent frozen compound forms in which the pretonic syllable formerly had a change-inducing property.

An alternative analysis could consider /^{HM}/ as merely allophonic, but since the derivation of bisyllabic nouns does not appear to be transparent, a change-inducing feature would seem to be needed in place of the tone contrast. Further study of bisyllabic noun formation is in order to see if patterns of derivation can be uncovered to account for their being realized with tone glide /^{HM}/ in their stressed syllable. As expected, the one distributional gap with this tone over syllable types is in short ballistic

⁹There is a small group of interrogative words that appears to constitute an exception to this statement, e.g., *hie^{HM}* 'where?', *ii^{HM}* 'when?'. It may be, however, that these forms, as question words, are morphemically complex.

checked syllables, where no corresponding 'source' with a /LH/ glide is known.

The status of the /HL/ glide is similar to that of /HM/. It occurs only as the tonic syllable of bisyllabic morphemes or as the changed form of a corresponding syllable whose basic tone is /L/. Bisyllabic nouns with this tone are attested with all syllable types except short ballistic open and long controlled checked.

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