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Verbal inflection in Yoloxóchitl Mixtec

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1. Introduction

Mixtec is a language family that together with Cuicatec and Triqui forms the Mixtecan branch of Oto-Manguean, a large and very diverse phylum of languages spoken in Mexico. In Mixtec languages, tone carries a significant functional load both in inflection and in derivation. For example, verbs in Mixtec languages have at least three main inflected forms: two aspects: incomplete (also called ‘habitual’, ‘continuative’, or even ‘present’) and complete (also called ‘past’) and one mood: irrealis (also called ‘potential’, or even ‘future’). It is particularly common for tone alone to distinguish the irrealis and the incomplete, though tone alone may also mark the complete. Some Mixtec languages use tone productively to mark negation, as in Metlatonoc (Overholt 1961:620) and Xochapa (Stark, Johnson, and Guzmán, 2006:120). As for derivation, though no longer a productive process, tone may also be manifested in transitivity alternations: as in Xochapa (Stark, Johnson, and Guzmán, 2006:118) and San Juan Colorado (Stark, Johnson, and Lorenzo 1986:168).¹ Similarly, tone is also involved in denominal adjective derivation in Chalcatongo Mixtec in what has been called ‘adjectival high’ by Hinton et al. (1991) and which Macaulay (1996:64–65) considers “somewhat productive”.² Yoloxóchitl Mixtec manifests all the preceding uses of tone: a low tone alone is an alternate way to mark the complete, a rising tone (/14/) is used to mark negation, a contrast between /1/ and /3/ tones distinguishes pairs of intransitive and transitive verbs, and a high tone marks not only in denominal adjectives but also attributive nouns and stative or resultative verbs.³

Despite what we consider the interesting tonal and segmental alternations in marking verbal aspect and mood, there have been few studies dedicated to this characteristic of Mixtec and even fewer based on a large lexical database and corpus. In this article, we broach this topic in relation to verbal inflection in Yoloxóchitl Mixtec, a Mixtec language spoken in a small cluster of villages located approximately three-and-a-half hours by car south of Acapulco along the Pacific Coast of the state of Guerrero (see map 1). We base our analysis on a large sample of 554 verbs from primary data collected by Amith and Castillo García.

¹ Note that for Yosondúa Mixtec a segmental morpheme (*x-* or *s-*) marks the transitive of intransitive/transitive pairs (Beatty de Farris et al. 2002:164). A similar segmental difference, along with tonal alternations, marks transitivity in San Juan Colorado Mixtec (Stark, Johnson, and Lorenzo 1986:167–8).

² Tonal variation accompanied by a final glottal stop is used to derive stative verbs in Ayutla (Hills 1990:198–9).

³ It is not altogether unlikely that there is some historical link between the use of high tone in the production of adjectives and its function in verbal morphology to mark the incomplete aspect as well as to form stative forms (see McKendry, 2013: 32–34, and Macaulay 1996: 65 and *passim*).



Map 1. Location of Yoloxóchitl Mixtec in Mexico.

Yoloxóchitl Mixtec (henceforth YM) is characterized by its high number of tonal contrasts (nine basic tones and over twenty-three lexical tonal melodies on bimoraic stems [see (1) and fn. 9]) and, not unexpectedly, the almost complete absence of tonal sandhi.⁴ Nevertheless, the tone of some enclitics may be conditioned by either the phonological environment (i.e., the preceding stem-final tone affects the tone of the enclitic) or by the syntactic environment (i.e., certain enclitics manifest a lower tone in phrase medial as opposed to phrase final position). As in other Mixtec languages, tone in YM carries a high functional load: tonal contrasts not only mark the aforementioned aspect and mood distinctions but person marking as well. After a stem final mid-high (/3/) or high (/4/), a tone /2/ encodes the first person (i.e., the subject of a predicate or the possessor of a noun). This tone is in complementary distribution with =*yu*¹, used after stems that end in tone /2/ or /1/ (see §4.1). YM tone is also involved in a set of other lexico-semantic changes. One, the ‘adjectival high’, is reported elsewhere (in YM, for example, *yu*¹*u*⁴ ‘stone’ > *yu*⁴*u*⁴ ‘solid’, *xa*²*an*² ‘fat’ > *xa*¹*an*² ‘greasy’, and *ñu*²*u*⁴ ‘earth’ > *ñu*⁴*u*⁴ ‘earth colored’). The function of other, somewhat irregular, tonal variations is not so easily defined and requires further study although many such variations seem related to the adjectivization function already mentioned. These additional tone-marked distinctions include:

- Marking of a noun as an attributive, a function particularly common in plant and animal names: *tio*¹*ko*⁴ ‘ant’ > *tio*¹⁴*ko*³ in the compound *i*³*ta*² (‘flower’) + *tio*¹⁴*ko*³ ‘*Montanoa grandifolia* DC’, a plant of the Asteraceae family known for its pungent ‘ant-like’ smell, and *tio*⁴*ko*⁴ in the compound *ña*¹*ña*⁴ + *tio*⁴*ko*⁴ (‘ant eater’); *ti*¹*i*⁴ ‘skunk’ > *ti*⁴*i*⁴ in the compound *yu*³*ba*² (‘edible green’) + *ti*⁴*i*⁴ ‘*Solanum nigrescens* M. Martens & Galeotti’, an edible plant of the Solanaceae family; *yu*³*ku*⁴ ‘hill’ > *yu*¹*ku*⁴ in the compound *ki*³*ni*² (‘pig’) + *yu*¹*ku*⁴ ‘wild boar’; and finally *i*³*su*² ‘deer’ >

⁴ One of the rare examples of possible sandhi is the sequence *ku*¹*un*¹ (‘go’ [IRR]) + verb with initial tone /3/, which shows a lowering of the initial tone of the verb: *ku*¹*ũ*¹ + *ku*³*chi*³ (‘bathe’) → *ku*¹*ũ*¹ *ku*¹*chi*³ (‘go to bathe’).

i^4su^4 in the compound ko^1o^4 ('snake') + i^4su^4 'boa' ('deer snake' is a common Mesoamerican calque).⁵

- Irregular adjectival/nominal marking: la^2la^1 'worn-out (bags, hammocks)' > la^2la^1 'worn-out clothes'.
- Marking of scale: bi^1xi^3 'cold' ~ bi^1xi^1 'lukewarm'.
- Marking of the characterization of time periods: sa^1bi^4 'rain' > sa^4bi^4 'rainy season'.
- Different modification functions: $ti^1ka^1yu^1$ 'jet' as a modifier used only with nda^4a^4 'black' to indicate 'jet black' and in $ti^4ka^1yu^1$ 'carbonized' (as in a heavily burnt tortilla).

Despite the rich and unexplored occurrence of tonal alternations in derivational morphology, in this paper we limit our study of tone to the marking of mood and aspect on verbs, a marking that manifests a fairly high degree of morphological regularity. That is, specific tones are consistently associated to specific aspect/mood values. This chapter begins with a brief overview of YM followed by a summary presentation of its segmental and autosegmental phonology (§3). There follows a discussion of the role of tone in YM inflectional and derivational morphology and patterns of tonal allophony that are dependent on phonological and morphosyntactic factors. Section 4 presents patterns of tonal variation related to verbal inflection in the irrealis, incomplete, complete and negative irrealis. We examine both tonal marking and segmental alternations. This study ends with a comparison of YM with verbal inflection in closely related Xochapan Mixtec to suggest the possibility of a regional pattern that typifies Guerrero Mixtec.

2. Yoloxóchitl Mixtec

Mixtec is here considered to be a language *family*, part of a larger unit, Oto-Manguean, that Suárez [1983:26] considers to be a 'hyper-family' or a 'stock'. Mixtecan languages (spoken in Oaxaca [156 municipalities], Guerrero [13 municipalities], and Puebla [10 municipalities]) are highly varied internally, the result of approximately 2,000 years of diversification. Estimates of the number of Mixtec languages vary (*Ethnologue* lists 53, Smith Stark [1995] mentions 45; Suárez (1983) estimates about 29 distinct languages; Bradley and Hollenbach [1988:1] suggest "perhaps twenty mutually unintelligible languages"). Likewise, the criteria utilized for such determinations also vary: mutual intelligibility is favored by SIL and *Ethnologue*; others (e.g., Josserand, 1983) compare lexicon and morphology in establishing isoglosses.

Following Josserand (1983), Mixtec languages are now commonly organized into five branches, represented in figure 1. Recognition of this internal diversity is not recent. The first grammarian of Mixtec, Fray Francisco de Alvarado, already remarked on the internal diversity of the family in his grammar of 1593.

⁵ For calques, see Campbell, Kaufman, and Smith-Stark, (1986) and Smith-Stark (1982, 1994)

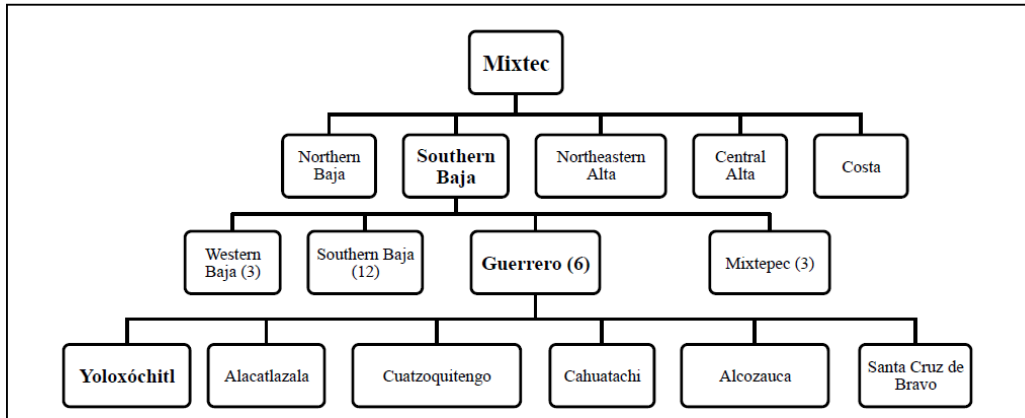


Figure 1. Mixtec family based on Josserand (1983), from DiCanio et al. (2014).

Both YM and Xochapan Mixtec (which, along with San Juan Colorado Mixtec, we discuss in the conclusion) are treated by Josserand (1983) as belonging to the Guerrero subgroup, which comprises six main varieties; Xochapan Mixtec is classified under the Alcozauca variety. Castillo García (2007), a native speaker of YM, reports reasonably good mutual intelligibility across the Guerrero subgroup, but the degree of intelligibility drops considerably when one compares YM with neighboring Mixtec varieties of the Southern Baja group such as Ayutla Mixtec. San Juan Colorado Mixtec is more distant and would probably show a low level of mutual intelligibility with YM although Castillo Garcia does not provide any qualitative judgements on the degree of intelligibility.

Yoloxóchitl Mixtec is spoken in four villages along the Pacific Coast of southern Guerrero, Mexico. The greatest linguistic vitality is found in the villages of Yoloxóchitl (pop. approx. 3,000) and Arroyo Cumiapa (pop. approx. 1,500) about 6.5 miles to the northeast of Yoloxóchitl. In both of these villages almost all speakers are highly fluent. Yoloxóchitl Mixtec is also spoken, though rapidly disappearing, in Cuanacaxtitlan (pop. approx. 4,000) and Buenavista and its surrounding farms (pop. approx. 5,000). In both these latter areas language loss, shift to Spanish and very high relexification is virtually complete among the younger generation. It is fair to say that in both Cuanacaxtitlan and Buenavista the ‘tipping point’ has been reached and the language has passed from one side to the other of what Fishman (1991) calls “the continental divide”, that is, the point at which intergenerational transmission of language ceases and maintenance becomes an often fruitless endeavour.

3. Basics of the tonal phonology of Yoloxóchitl Mixtec.

YM has 17 consonant segments and five cardinal vowels (DiCanio et al. 2014). We consider both nasalization and laryngealization to be autosegmental features. With few exceptions (apparently the result of recent compounding) nasalization is restricted to the stem-final mora; laryngealization occurs only on the penultimate mora. Thus when a laryngealized stem combines with a following bimoraic stem, laryngealization is lost in the now non-penultimate position: $xa^?^1a^4$ ‘foot’ + $ku^?^1u^1$ ‘area (be it urban or distant from a village) overgrown with weeds’ becomes $xa^{14}ku^?^1u^1$ ‘distant (from an inhabited area) woods’. There are other co-occurrence restrictions: a laryngealized vowel can only precede a stem-final consonant if it is voiced; a nasalized vowel can only follow a stem-final consonant if it is voiceless. Given

these restrictions there are no CVCV words in YM with both a laryngealized and nasal vowel although there are CVV and CV?V stems with both features: *iʔin*³ ‘scratch’ (transitive verb).⁶

The five cardinal vowels also manifest interesting distributional patterns. With virtually no exception the two vowels of CVV stems are identical, a pattern that suggests either vowel lengthening to fulfil phonotactic constraints on minimal word formation or a rigorous process of vowel harmonization. Regardless of the stem syllable structure, however, stem nasal vowels are limited (with one exception) to /ã/, /ĩ/, and /ũ/.⁷ The occurrence of nasal /ẽ/ and /õ/ in enclitics is probably the result of phonologically motivated vowel quality shift from underlying /ã/ and /ũ/, respectively.

YM has nine basic tones that can occur on a single mora: four level tones (written as superscript numbers from /1/ for the low tone through /4/ for the high tone); three rising tones (/13/, /14/, and /24/) and two falling tones (/32/ and /42/).⁸ Again there are significant distributional gaps. Tone /2/ is never found on the initial mora; /32/ and /42/ are only word final and occur in the absence of any contrast with /31/ and /41/, both of which are absent in YM tonal phonology. Finally, of the 89 occurrences of final mora rising tones found in the lexicon (/13/, /14/, and /24/) all but two occur after a previous high (/4/) tone.⁹ Even though it does bear significant functional weight as a 1st-person enclitic after stems that end in final /4/ or /3/, it is highly likely that the low middle /2/ is innovative.

Monomoraic words are rare. They are limited to some 40 in total and are almost exclusively function words such as modals, clausal markers and adverbs. The vast majority of content words in YM are bimoraic, either mono- or disyllabic, though longer trimoraic words are not uncommon. There are 23 tonal melodies on bimoraic lexical stems. As expected, some tonal melodies are more frequent than others. Indeed, two of the twenty-three melodies on bimoraic stems (3-13 and 3-14; see fn. 9) are limited to one word each. The remaining melodies are exemplified in the nouns and adjectives in (1). However, if morphological tone was to be taken into account (e.g., verbal inflection for aspect and mood, negation, and 1st-person marking), the number of realized patterns on bimoraic stems would increase considerably. For example, including inflectional morphology, the sequence /na^Tma^T/ alone manifests 21 tonal contrasts. These are different than the 21 lexical melodies as the verb paradigm includes tonally marked morphemes (e.g., negation and first person)

(1)	/1-1/	bi ¹ ka ¹	‘comb’	/4-3/	iʔ ⁴ in ³	‘mute’
	/1-3/	ta ¹ a ³	‘man’	/4-4/	sa ⁴ bi ⁴	‘rainy season’
	/1-4/	xi ¹ i ⁴	‘grandfather’	/4-13/	che ⁴ e ¹³	‘big’
	/1-32/	xa ¹ ko ³²	‘opossum’	/4-14/	na ⁴ ni ¹⁴	‘long (PL)’
	/1-42/	ta ¹ kwi ⁴²	‘water’	/4-24/	ya ⁴ a ²⁴	‘tongue’
	/3-2/	ñu ³ u ²	‘village’	/13-2/	tiʔ ¹³ bi ²	‘lightning bug’
	/3-3/	taʔ ³ ni ³	‘animal breast’	/14-1/	naʔ ¹⁴ a ¹	‘demoniac’
	/3-4/	bi ³ ko ⁴	‘feast’	/14-2/	ma ¹⁴ ñu ²	‘central place’

⁶ Although we consider laryngealization an autosegmental feature, we still represent this phonation type with <ʔ>. Likewise, following convention we write nasal vowels with a following <n>, although an orthography using forms with a tilde might be preferable.

⁷ The only stem occurrence of /ẽ/ is in the noun *le*³*en*⁴ ‘genital liquid’ (male or female).

⁸ There is one function word and two adverbs, all monomoraic, with /143/. Two plant names have similarly complex tones: *pi*^ʔ*la*⁴*xi*¹³² ‘*Jaltomata darycana*’ and *ku*⁴*tu*¹*pi*³⁴² ‘*Plumbago scandens*’. In this latter case the name is onomatopoeic for the sound the flowers make when blown through by playing children.

⁹ The melody /3-13/ is only attested in the passive-oriented verb *kia*^ʔ*bi*¹³ ‘be sold’, while /3-14/ occurs only in the quantifier *i*³*nda*¹⁴ ‘one’.

/3-42/	ñu ³ u ⁴²	‘night’	/14-3/	nu ¹⁴ u ³	‘face’
/4-1/	yaʔ ⁴ a ¹	‘darkish, brown’	/14-4/	yeʔ ¹⁴ e ⁴	‘door’
/4-2/	xaʔ ⁴ a ²	‘lime-soaked maize (nixtamal)’			

Some melodies are common across all syllable types (/1-1/, /1-3/, /1-4/, /3-2/, /3-3/, /3-4/, /4-2/ and /4-4/) and at least six patterns are much more common in disyllabic than in monosyllabic bimoraic words (/1-32/, /4-1/, /4-3/, /13-2/, /14-2/, /14-3/). Finally, in addition to /3-13/ and /3-14/, which occur in one word each, seven patterns are extremely rare in the lexicon (/1-42/, /3-13/, /3-14/, /3-42/, /4-13/, /4-14/, /14-1/). Moreover, the distribution of tones is asymmetrical. While the first mora allows for only five possibilities, the second mora, which is lengthened, allows for nine (although two, /13/ and /14/, are relatively rare). Note that /31/ is never found in lexical or inflected words, either in a bimoraic melody /3-1/ or on a single mora /31/.

As the object of our study is the role of tone in the making of the verbal inflection of YM, in the next section we concentrate on verbs.

3.1. Sample and the tonal structure of verbs.

Our analysis of the verbal inflection of YM is based on a sample of 554 verbs taken from a large lexical database presently comprising up to 2,192 lexical entries. This database was compiled by Jonathan D. Amith and Rey Castillo García as a principal outcome for the documentation project “Corpus and lexicon development: Endangered genres of discourse and domains of cultural knowledge in Tuʔ¹un³ i⁴sa¹bi¹⁴ (‘the Mixtec language’) of Yoloxóchitl, Guerrero” (see also Amith and Castillo García, n.d. 1 and n.d. 2).¹⁰

The sample of 554 YM verbs used in this study is balanced in regard to moraic structure and transitivity. The sample contains an almost equal number of bimoraic and trimoraic verbs in almost equal proportion regarding transitivity (2), (‘intr’ stands for ‘intransitive’; ‘tr’ for ‘transitive’ and ‘ditransitive’).

(2)	intr	tr/dtr	Total
Bimoraic	183	99	282
Trimoraic	182	90	272
Total	365	189	554

Many trimoraic words in YM are formed by compounding or by derivation (the latter may involve productive mechanisms or archaic ones, the latter resulting in what are now frozen forms). This has consequences for the distribution of the tonal patterns in such trimoraic words as they are associated with the patterns found on the bimoraic words on which they are based. For example, a denominal verb formed by adding a particular prefix to a nominal stem will have a tonal pattern properly of nouns over its final two morae. A detailed analysis of the relation between tonal melodies in bimoraic and trimoraic words,

¹⁰ A note on the structure of the dictionary is in order. Primary verbal entries are found under the irrealis form, but the total number of entries also includes approximately 120 ‘place-holders’ or cross-references. For example, when a verb has an irrealis form which stands in a suppletive relation to the incomplete, the incomplete form is given an entry but this entry is without semantic content. The entry is simply a pointer to the main verb entry, in the irrealis mood. Additionally, dictionary entries have also been established for iterative verbal formations using the prefix *nda*³- when the semantics of the iterative are not transparent.

however, would require a level of effort that is beyond the scope of the present article. The focus below is on bimoraic verbs.

3.1.1. Bimoraic verbs.

The lexicon of YM has no monomoraic verbs, so that like nouns and adjectives, a verb with a bimoraic stem instantiates the basic lexical template for a verbal lexeme.¹¹ There are 282 bimoraic verbs in our sample. Some examples appear in (3), inflected in the irrealis.

- (3) a. ka³a⁴ (intr) ‘slip’
 tu³tu⁴ (intr) ‘whistle’
 ka³xi⁴ (tr) ‘eat’ ‘bite’ or ‘bite into’ (foods such as fruit, popcorn, *pozole*, and sometimes meat, chicken or cheese)¹²
 sa³ta⁴ (tr) ‘buy’
 b. ke¹yu⁴ (intr) ‘swim’
 c. chi³kun² (tr) ‘hang’

The verbs in (3) have different tonal melodies: /3-4/ in (3a), /1-4/ in (3b) and /3-2/ in (3c), respectively. With few exceptions, the tonal melody of the irrealis represents lexical tone, i.e. the tonal melody representative of the basic lexical form.

Throughout the YM verbal lexicon, contrastive tonal melodies also correlate with lexical contrast. For example, the pairs in (4) differ only in tone, their segments being identical. The contrasts may involve differences in the first mora as in (4a), differences in the second mora, as in (4b), or differences in both morae, as in (4c).

- (4) a. ka¹ku³ /1-3/ (intr) ‘escape’ ~ ka³ku³ /3-3/ (intr) ‘be born’
 ke¹ta³ /1-3/ (intr) ‘get in’ (SG sub.) ~ ke³ta³ /3-3/ (intr) ‘get out’ (SG sub.)
 b. ki¹ni⁴ /1-4/ (intr) ‘be balanced’ ~ ki³ni⁴ /3-4/ (tr) ‘shoot’
 ka³ba³ /3-3/ (intr) ‘lie to sleep’ ~ ka³ba⁴ /3-4/ (tr) ‘turn around’
 ka³si² /3-2/ (tr) ‘take shortcut’ a ~ ka³si⁴ /3-4/ (intr) ‘get goose bumps’
 c. ka¹an¹ /1-1/ (intr) ‘get drilled’ ~ ka¹an³ /1-3/ (intr) ‘get used’
 ka¹a¹ /1-1/ (intr) ‘drown’ ~ ka³a³ /3-3/ (intr) ‘emit a sound’
 ka¹sun¹ /1-1/ (intr) ‘creak’ ~ ka³sun² /3-2/ (intr) ‘get fried’
 ti³bi² /3-2/ (intr) ‘blow out air’ ~ ti¹⁴bi³ /14-3/ (intr) ‘rot’

Minimal triplets also exist, and they emerge as a combination of the contrasts in (4) in unpredictable ways. For example, the triplets in (5) each show different patterns of contrast.

- (5) a. kwi¹i⁴ /1-4/ (intr) ‘fight’
 kwi³i⁴ /3-4/ (tr) ‘peel’
 kwi³i³ /3-3/ (intr) ‘be able’

¹¹ Our sample includes bimoraic and trimoraic verbs, but excludes several quadrimoraic verbs present in the dictionary (e.g. ta³xi³kwa²a⁴ ‘keep’, ka³sa³chiu⁴un⁴ ‘work’, among others). Such quadrimoraic verbs, nevertheless, follow the same principles as bimoraic and trimoraic verbs.

¹² Ka³xi⁴ contrasts with ku³xi³ used for eating meals, mole, tortillas and most other foods. The eating of meat can be expressed by either verb in patterns, if any, that are not yet fully understood.

- b. kwi^1so^1 /1-1/ (intr) ‘boil’
 kwi^1so^3 /1-3/ (intr) ‘be pricked’
 kwi^3so^3 /3-3/ (tr) ‘load’
- c. ta^1ni^1 /1-1/ (intr) ‘be spoilt’
 $ta^{14}ni^3$ /14-3/ (intr) ‘bruise’
 ta^3ni^3 /3-3/ (intr) ‘be carried away by water’
- d. tu^3u^3 /3-3/ (tr) ‘sting’
 tu^1u^3 /1-3/ (intr) ‘appear’
 tu^3u^4 /3-4/ (intr) ‘roll’

The irrealis forms of the 282 bimoraic verbs in our sample display a total of 12 different tonal melodies, given in table 1. Lexical verb stems, therefore, manifest only 12 of the 23 documented tonal possibilities for bimoraic stems. This absence is reflective of the fact, discussed in continuation, that high tone in the first mora of verbs is ‘reserved’ to mark the incompletive aspect.¹³ Among the absent patterns, /13-2/ is not uncommon in the overall lexicon although /3-13/ is found only in one verb, $kia^{23}bi^{13}$, but in no other lexical stem.

Table 1. Tonal melodies in lexical stems of bimoraic verbs (irrealis forms only).

		$\mu 2$						
		/1/	/2/	/3/	/4/	/13/	/32/	
$\mu 1$	/1/	46	—	34	26	—	4	110
	/3/	0	25	85	45	1	0	156
	/4/	0	0	0	0	0	0	0
	/13/	0	0	0	0	0	0	0
	/14/	1	7	7	1	0	0	16
		47	32	126	72	1	4	282

In table 1, ‘0’ indicates tonal melodies that are attested elsewhere in the lexicon but are not found in bimoraic verbs; ‘—’ indicates tonal melodies that are not attested anywhere in the lexicon. As a general rule, there are no bimoraic verbs in the irrealis with a lexical high tone /4/ on the first mora ($\mu 1$)¹⁴ as this tone is the inflectional exponent of the incompletive (see §5.2). A further analysis, table 2, reveals that by default bimoraic verbs have tones /1/ or /3/ (only a few have /14/) on $\mu 1$. There is a greater range of tone values for the second mora ($\mu 2$), although 45 percent of the total number of verbs (126 of 282) have tone /3/ on $\mu 2$. Many verbs also have harmonized melodies: 46 (16.3 %) have /1-1/ and 85 (30.0 %) have /3-3/. That is, close to 50 percent of bimoraic irrealis verbs have harmonized tone.

The distribution of tonal melodies in lexical entries displays an interesting correlation with transitivity. Consider for this purpose the data in table 2, where we have given the transitivity status of bimoraic verbs.

¹³ Indeed, seven of the eleven absent melodies have an initial /4/ tone.

¹⁴ One stative manifests the melody /4-14/, which is limited to four words, all disyllabic.

Table 2. Lexical tonal melody and transitivity in bimoraic verbs.

		$\mu 2$						intr	tr	
		/1/	/2/	/3/	/4/	/13/	/14/			/32/
$\mu 1$	/1/ intr	38	0	30	24	0	0	4	96	
	tr	8	0	4	2	0	0	--		14
	/3/ intr	0	11	54	13	1	0	0	79	
	tr	0	14	31	32	0	0	0		77
	/14/ intr	1	3	3	1	0	0	0	8	
	tr	0	4	4	0	0	0	0		8
									183	99

We see from table 2 that almost 90 percent (96 out of 110) of bimoraic verbs with tone /1/ on $\mu 1$ are intransitive. Verbs with /1/ on the first mora constitute half of the intransitive bimoraic verbs (96 out of 183) but only 15 percent of the transitives (14 out of 99). This reveals a strong correlation between phonology and transitivity: a verb bearing lexical melodies such as /1-1/, /1-3/, /1-4/ or /1-32/ is expected to be intransitive. In contrast, a tone /3/ or /14/ on $\mu 1$ is uninformative about transitivity.

The correlation of tonal melody and transitivity is partly exploited in the lexicon through the existence of a set of valence pairs that contrast only in tone. In such patterns, the intransitive verb often depicts an inchoative state of affairs, a sort of passive meaning. That is, the semantics of the intransitives suggest an implicit and unexpressed agent. This indicates that, at least historically, the direction of derivation might have been intransitivization. This is consistent with the fact that tone /1/ is closely associated with intransitivity (+ 90%) while tone /3/ is uninformative in this regard.¹⁵

There are various patterns involved in such intransitive/transitive pairs, given in (6), all in the irrealis form. In all of them, the intransitive verb has tone /1/ on $\mu 1$ and the transitive verb tone /3/. In patterns (6a) and (6b), the tone on $\mu 2$ remains constant, which would seem to indicate that the transitivity alternation, at least historically, was motivated by a tonal change on the first mora alone, a pattern to be expected given the position of morphological tone in general. In (6c) and (6d) the tone on the second mora of the transitive shifts as well, but in (6c) this is clearly due to a phonotactic constraint on /3-1/ melodies, which occur nowhere in YM. The upward shift to tone /4/ on the final mora is irregular and unexplained (6d). It might reflect some underlying tonal difference between the two sets: (6c) regular from a phonotactic constraint and (6d) irregular transitive patterns from /1-1/ intransitives.¹⁶

¹⁵ The agent can be syntactically expressed but only in a juxtaposed clause with the meaning ‘X did it’. Such constructions are used when the patient is topic. Note the following:

- (i) a. $ni^1\text{-}ku^1un^4$ $ya^{\text{a}}^3a^4$ [$i^{13}xa^3$ Juan]
 CPL-be.ground chilli CPL.do John
 ‘The chilli (old information) was ground by John.’
- b. $ni^1\text{-}ko^{\text{a}}^1ni^4$ $ji^1ndi^1ki^4$ [$i^{13}xa^3$ Juan]
 CPL-be.milked cow CPL.do John
 ‘The cow (old information) was milked by John.’

¹⁶ Other alternations between /1/ ~ /3/, are possibly related to the alternation that marks transitivity: ke^1ta^3 ‘enter’ (SG subj.) and ke^3ta^3 ‘exit’ (SG subj.) and, despite the segmental difference, nde^1e^3 ‘enter’ (PL subj.) and ke^3e^3 ‘exit’ (PL subj.).

(6)	a.	ku ¹ un ⁴	/1-4/	(intr)	‘be ground’	~	ku ³ un ⁴	/3-4/	(tr)	‘grind chilli for sauce’
		ko [?] ni ⁴	/1-4/	(intr)	‘be milked’	~	ko [?] ni ⁴	/3-4/	(tr)	‘milk’
		kwi ¹ i ⁴	/1-4/	(intr)	‘peel off’	~	kwi ³ i ⁴	/3-4/	(tr)	‘peel’
		nda ¹ ta ⁴	/1-4/	(intr)	‘get split in two’	~	nda ³ ta ⁴	/3-4/	(tr)	‘split in two’
		ta [?] bi ⁴	/1-4/	(intr)	‘get broken’	~	ta [?] bi ⁴	/3-4/	(tr)	‘break’
		ta ¹ xi ⁴	/1-4/	(intr)	‘be fired from work’	~	ta ³ xi ⁴	/3-4/	(tr)	‘fire from work’
		tu ¹ xi ⁴	/1-4/	(intr)	‘be crushed’	~	tu ³ xi ⁴	/3-4/	(tr)	‘crush’
	b.	na ¹ ma ³	/1-3/	(intr)	‘get changed’	~	na ³ ma ³	/3-3/	(tr)	‘change’
	c.	ka ¹ an ¹	/1-1/	(intr)	‘get drilled’	~	ka ³ an ²	/3-2/	(tr)	‘drill’
		tu ¹ un ¹	/1-1/	(intr)	‘get turned on’ ¹⁷	~	tu ³ un ²	/3-2/	(tr)	‘turn on’
	d.	ka ¹ ba ¹	/1-1/	(intr)	‘turn around’	~	ka ³ ba ⁴	/3-4/	(tr)	‘turn around’
		ka [?] yu ¹	/1-1/	(intr)	‘be written’	~	ka [?] yu ⁴	/3-4/	(tr)	‘write’

3.1.2. Trimoraic verbs.

Apart from bimoraic verbs, a significant number of YM verbs are trimoraic. There are 272 such verbs in our sample, displaying a total of 22 different tonal melodies, illustrated in table 3.

Table 3. Tone melodies in trimoraic verbs.

Melody	#	intr	tr	Example
/1-1-3/	1	1	0	ku ¹ nda [?] 1a ³ (intr) ‘move away’
/1-1-4/	1	1	0	ku ¹ nu [?] 1u ⁴ (intr) ‘get back home’
/1-4-4/	1	1	0	ki ¹ tu [?] 4un ⁴ (intr) ‘be pulled out (part of a whole)’
/1-4-2/	1	1	0	tu ¹ xu [?] 4u ² (intr) ‘get harmed’
/3-1-1/	20	16	4	nda ³ kwi ¹ kun ¹ (intr) ‘sprout, spring’
/3-1-3/	21	19	2	ka ³ ki [?] 1i ³ (intr) ‘trip’
/3-1-32/	1	1	1	ku ³ bi ¹ xi ³² (intr) ‘grow white hair’
/3-1-4/	12	11	1	ku ³ ma ¹ ni ⁴ (intr) ‘lack’
/3-2-2/	8	3	5	ndo ³ ko ² o ² (intr) ‘get up of bed’
/3-3-2/	34	23	11	nda ³ ye [?] 3e ² (intr) ‘shine’
/3-3-3/	57	35	22	ku ³ ndi ³ xi ³ (intr) ‘get dressed’
/3-3-4/	43	24	19	nda ³ ke ³ e ⁴ (intr) ‘become stretched’
/3-3-42/	2	2	0	ku ³ ñu ³ u ⁴² (intr) ‘get dark (at night)’
/3-4-1/	5	4	1	ndu ³ ka ⁴ chi ¹ (intr) ‘become equal’
/3-4-13/	1	1	0	xi ³ ka ⁴ ba ¹³ (intr) ‘get turned around’
/3-4-2/	7	4	3	ko ³ se [?] 4e ² (intr) ‘hide oneself’
/3-4-24/	11	10	1	xu ³ ku ⁴ tu ²⁴ (intr) ‘roll’
/3-4-3/	18	10	8	ku ³ bi ⁴ ka ³ (intr) ‘get rich’
/3-4-4/	22	12	10	ta ³ xa [?] 4a ⁴ (intr) ‘dance’
/3-14-2/	2	1	1	ku ³ to ¹⁴ o ² (intr) ‘fancy or crave’
/3-14-3/	2	1	1	ku ³ nu ¹⁴ u ³ (intr) ‘examine in detail’
/14-1-1/	2	1	1	xo ¹⁴ kwi ¹ in ¹ (intr) ‘turn around to see’
Total	272	182	90	

¹⁷ Said of an electric device.

As with bimoraic verbs, trimoraic verbs may also have tones /1/, /3/ or /14/ on μ_1 , but tones /1/ and /14/ are very rare (found only in 6 verbs). Thus trimoraic melodies almost always start with tone /3/. This would not be unexpected if, historically, trimoraic verbs were formed from a derivational morpheme prefixed to a bimoraic verbal stem. Most derivational verbal prefixes do indeed carry a mid tone /3/ (the completive marker *ni*^l- being an inflectional morpheme). Thus the tonal pattern on μ_1 of trimoraic verbs is correlated to the tones of derivational morphemes. This consistency of tone marking on the first mora of trimoraic verbs means that the functional lexicosemantic contrast lies on μ_2 and μ_3 . In many ways the melodies of the final two morae of trimoraic verbs are similar to the melodies of bimoraic verbs, except for those cases with a high tone /4/ or a low-mid tone /2/ on the middle mora. Instances of tone /4/ occur most often in deadjectival verbs. A mid-mora /2/ occurs only after initial-mora /3/. Compare table 4 with table 1. Relevant contrasts have been highlighted.

Table 4. Tonal melodies of last two morae in lexical stems of trimoraic verbs.

		μ_3									
		/1/	/2/	/3/	/4/	/13/	/14/	/24/	/32/	/42/	
μ_2	/1/	22	0	22	13	0	0	0	1	0	58
	/2/	0	8	0	0	0	0	0	0	0	8
	/3/	0	34	57	43	0	0	0	0	2	136
	/4/	5	8	18	23	1	0	11	0	0	66
	/13/	0	0	0	0	0	0	0	0	0	--
	/14/	0	2	2	0	0	0	0	0	0	4
	/24/	0	0	0	0	0	0	0	0	0	--
	/32/	0	0	0	0	0	0	0	0	0	--
	/42/	0	0	0	0	0	0	0	0	0	--
Total	27	52	99	79	1	--	11	1	2	272	

Minimal pairs involving trimoraic verbs also occur. Like those of bimoraic verbs, the contrasts may involve differences in the tone linked to μ_2 , as in (7a), or to μ_3 , as in (7b). Triplets of minimal pairs involve a combination of such possibilities (7c).

- (7) a. $ku^3nda^1a^4$ /3-1-4/ (intr) ‘grow hoarse’ ~ $ku^3nda^4a^4$ /3-4-4/ (intr) ‘darken’
 b. $ko^3nde^3e^3$ /3-3-3/ (intr) ‘sit’ (PL sub.) ~ $ko^3nde^3e^4$ /3-3-4/ (intr) ‘endure’
 $ka^3ti^1in^1$ /3-1-1/ (intr) ‘resound, throb’ ~ $ka^3ti^1in^3$ /3-1-3/ (intr) ‘pile up’
 c. $ku^3na^?a^1$ /3-1-1/ (intr) ‘be free, not be busy’
 $ku^3na^?a^2$ /3-3-2/ (intr) ‘get founded’
 $ku^3na^?a^4$ /3-3-4/ (intr) ‘take a long time’

As with bimoraic verbs, a given trimoraic verb often forms part of a transitivity pair. In all such pairs, the intransitive verb has a low tone and the transitive one a mid-high tone, the same pattern found in the bimoraic transitivity alternations. While the members of the pair may realize the contrastive tone on μ_1 as in (8a), it is more common that the tonal contrast is realized on μ_2 (8b). This is another indication that the stem of trimoraic verbs consists of a bimoraic root—in reality a historical bimoraic stem—plus an initial stem formative that we

will mark with the plus sign (+). In (8b) the initial stem formative is the iterative nda^3- , which easily explains why the contrast is realized on μ_2 (and occasionally on μ_3 as well: $nda^3+sa^1ka^1$ vs. $nda^3+sa^3ka^4$). Thus the intransitive/transitive alternation is marked on μ_1 of the bimoraic stems to which the iterative is prefixed.

- (8) a. $ki^1+tu^4un^4$ /1-4-4/ (intr) ‘be pulled off’ ~ $ki^3+tu^4un^4$ /3-4-4/ (tr) ‘pull off’
 b. $nda^3+ka^1ya^1$ /3-1-1/ (intr) ‘gather up’ ~ $nda^3+ka^3ya^2$ /3-3-2/ (tr) ‘gather up’
 $nda^3+sa^1ka^1$ /3-1-1/ (intr) ‘get mixed up’ ~ $nda^3+sa^3ka^4$ /3-3-4/ (tr) ‘mix up’
 $nda^3+tu^1u^4$ /3-1-4/ (intr) ‘get wrapped up’ ~ $nda^3+tu^3u^4$ /3-3-4/ (tr) ‘wrap up’
 $nda^3+ka^1ya^1$ /3-1-1/ (intr) ‘come together (e.g., individuals in a meeting)’ ~ $nda^3+ka^3ya^2$ /3-3-2/ (tr) ‘reunite’

The intransitive/transitive pairs may also involve equipollent verbs that contrast not in tone but in the segments of the stem formatives, as in (9). In such pairs, the intransitive verb has the stem formative ku^3/ko^3+ while the transitive varies: the examples in (9) illustrate ka^3+ , chi^3+ and ta^3+ as the transitive formatives.

- (9) a. $ku^3+ta^3ni^3$ /3-3-3/ (intr) ‘hang down’ ~ $ka^3+ta^3ni^3$ /3-3-3/ (tr) ‘hang’
 $ku^3+ndi^3chi^2$ /3-3-2/ (intr) ‘get up’ (SG sub.) ~ $ka^3+ndi^3chi^2$ /3-3-2/ (tr) ‘place up’ (SG obj.)
 b. $ku^3+ndu^4u^4$ /3-4-4/ (intr) ‘sit down’ (SG sub.) ~ $chi^3+ndu^4u^4$ /3-4-4/ (tr) ‘put down’ (SG obj.)
 c. $ko^3+se^4e^2$ /3-4-2/ (intr) ‘hide oneself’ ~ $ta^3+se^4e^2$ /3-4-2/ (tr) ‘hide’

Other pairs such as those in (10) involve trimoraic verbs derived from suppletive bimoraic stems in which the transitivity alternation is marked on the segmental contrast of both the middle syllable (the initial consonant of the base bimoraic stem) and on the stem formative (10a). Another pattern is seen in (11), in which in addition to the suppletive stem, the transitivity alternation is linked to a prefix. This prefix may be associated with the intransitive (11a) or transitive (11b), a situation probably related to the detransitivizing (11a) or the transitivizing (11b) semantics of the formative.

- (10) a. $ndu^3+ndi^3kun^2$ /3-3-2/ (intr) ‘regenerate’ ~ $nda^3+chi^3kun^2$ /3-3-2/ (tr) ‘regenerate’
 b. $nda^3+ta^1nu^1$ /3-1-1/ (intr) ‘get bent’ ~ $nda^3+ka^1nu^1$ /3-1-1/ (tr) ‘bend’
 (11) a. $ku^3+ndi^3kun^2$ /3-3-2/ (intr) ‘get hung up’ ~ chi^3kun^2 /3-2/ (tr) ‘hang up’
 b. nu^1na^4 /1-4/ (intr) ‘become’ ~ $ndu^3+ku^3na^4$ /3-3-4/ (tr) ‘open’

Although the base verb of (11b) is suppletive at the segmental level (/n~/k/), the tonal alternation is reminiscent of that found in (6) in which /1/ is associated with the intransitive and /3/ with the transitive. Thus while the valence of the second verb in (11b) might be accounted for by the tone /3/, it is also possible that ndu^3- performs some sort of transitivizing function, such as that typical of a causative. Such seemingly causative morphemes are illustrated by the verbs in (12). In no case, however, are either cha^3+ or xi^3+ productive, as is the commonly used causative marker sa^4- , discussed below.

- (12) a. ka^3ba^3 /3-2/ (intr) ‘lie down’ ~ $cha^3+ka^3ba^3$ /3-3-2/ (tr) ‘lie down’
 kwi^3in^3 /3-3/ (intr) ‘hang up’ ~ $cha^3+kwi^3in^3$ /3-3-3/ (tr) ‘hang up’
(PL sub.) (PL sub.)
b. kwa^3a^3 /3-3/ (intr) ‘be made’ ~ $xi^3+kwa^3a^4$ /3-4-4/ (tr) ‘be made’

Stem formatives such as ndu^3+ , cha^3+ or xi^3+ are not productive and are restricted to a small number of lexical forms. In some cases the historical derivation is apparent: $chi^3+kul^3ba^2$ ‘measure’ is undoubtedly related to ku^3ba^2 ‘measure (noun)’. In other cases the trimoraic verbs are lexically basic; that is, the final two morae do not correspond to any discernible lexical item presently found in YM. Thus $ku^1ndu^1u^4$ ‘bush’ and $ti^1ndu^1u^4$ ‘lit firewood’ imply a stem, $*ndu^1u^4$ or $*ndu^1u^4$, that is non-existent in YM at the present time. These cases may be contrasted to clearly productive derivational processes in which both elements are identifiable: $ku^3+bi^1xi^{32}$ ‘get white hair’ from bi^1xi^{32} ‘white hair’ and the inchoative marker ku^3- .

In contrast to the causative-like semantics of some stem formatives, such as those just discussed, YM has a genuine productive causative prefix, sa^4- , that can be prefixed to both bimoraic and trimoraic verbs (see 13). In some cases the semantic relation between the causative form and a base verb is not clear (13c) as, in this case, the only possible base verb, kwa^3a^3 , is used only in a ritual context with a meaning to the effect of ‘be benefitted by’ not clearly related to the meaning, ‘study’, of the causative. In most cases, however, the semantics of the causative derivation is clear.

- (13) a. ka^1a^1 (intr) ‘drown’ > $sa^4-ka^1a^1$ (tr) ‘drown [sb.]’
 ka^1an^1 (intr) ‘talk’ > $sa^4-ka^1an^1$ (tr) ‘make talk’
 ki^1bi^3 (intr) ‘get in’ > $sa^4-ka^1ku^3$ (tr) ‘force in’
 na^3nu^3 (intr) ‘get fat’ > $sa^4-na^3nu^3$ (tr) ‘fatten’
 chi^3chin^4 (intr) ‘suckle’ > $sa^4-chi^3chin^4$ (tr) ‘breast feed’
b. $nda^3+i^3chi^2$ (intr) ‘dry up’ > $sa^4-nda^3i^3chi^2$ (tr) ‘dry’
 $nda^3+ka^3a^4$ (intr) ‘trip’ > $sa^4-nda^3-ka^3a^4$ (tr) ‘trip [sb.] up’
 $nda^3+ka^3an^4$ (intr) ‘remember’ > $sa^4-nda^3-ka^3an^4$ (tr) ‘remind’
 $tu^1+xu^1u^2$ (intr) ‘get hurt’ > $sa^4-tu^1xu^1u^2$ (tr) ‘harm’
 $ku^1+nda^1a^3$ (intr) ‘move up’ > $sa^4-ku^1nda^1a^3$ (tr) ‘remove’
c. $sa^4+kwa^3a^3$ (intr) ‘study’

In our analysis of tonal patterns in verbal aspect marking we have excluded any verbs bearing the prefix sa^4- . This responds to the high frequency and productivity of this causative marker. We have also excluded in our sample about a dozen quadrimoraic verbs, such as those in (14).

- (14) $cha^3+ka^3+ndu^1u^4$ (tr) ‘lay down’
 $ka^3+sa^3+chiu^4un^4$ (intr) ‘work’
 $ka^3+si^3+kwe^3e^2$ (intr) ‘get upset’
 $ku^3+ta^3+nde^3e^3$ (intr) ‘bend down’
 $ku^3+ti^3+sa^4ma^3$ (intr) ‘coagulate’
 $nda^3+ka^1+tu^4un^4$ (tr) ‘ask’
 $nda^3+ki^3+nde^3e^4$ (intr) ‘rest’
 $nda^3+xi^3+ko^4ni^3$ (tr) ‘turn around’
 $ta^3+xi^3+kwa^4a^4$ (tr) ‘keep’

4. Tone and verbal inflection in Yoloxóchitl Mixtec.

The previous sections presented both the wealth and diversity of tonal contrasts in YM as well as its significant functional role. This role includes verbal inflection, the topic of this present section. Tone is not only used for the marking of first-person singular subject but, most importantly, for marking aspect, mood and polarity values, an encoding of grammatical function that is remarkably systematic. We start with a brief description on how tone marks person and then move to the encoding of aspect, mood and polarity.

4.1. Tone and the marking of person.

In YM, the subject of verbs and possessor of nouns is encoded by means of enclitics. For the first person, there are four allomorphs, three segmental ($=yu^1$, $=e^1$ and $=i^1$) and one tonal ($=^2$). The distribution of these allomorphs is phonologically conditioned. Enclitics $=e^1$ and $=i^1$ are the most restricted, both occur after stems with a tone /1/ on the final mora, the former after stems ending in /a/ or /o/, the latter after stems ending in /u/. For all other cases, enclitic $=yu^1$ occurs after stems with a final /1/ or /2/ and $=^2$ after stems with a final /3/ or /4/.

Tone /2/ is affixed to a stem ending in /3/ or /4/ to mark first person, e.g. ki^1ta^3 ‘enter’ > $ki^1ta^3=^2$ ‘I enter’; ka^1xan^4 ‘sneeze’ > $ka^1xan^4=^2$ ‘I sneeze’; or ka^3ta^4 ‘feel itchy’ > $ka^3ta^4=^2$ ‘I feel itchy’. Depending on the tonal melody of the stem, the stem-final tone may be elided before the enclitic, creating a surface form contrasting in person, e.g. ku^3xa^3 ‘mature’ > $ku^3xa^{(3)=^2}$ > ku^3xa^2 ‘I mature’ or $ndo^?^4o^4$ ‘suffer’ > $ndo^?^4o^{(4)=^2}$ > $ndo^?^4o^2$ ‘I suffer’. The general pattern suggests maintenance of stem-final tone when the tonal melody over the final two stem morae is rising (i.e., /1-3/, /1-4/ and /3-4/). Elision of stem-final tone occurs when the tonal melody on the bimoraic stem is level or falling (i.e., /3-3/, /4-3/ and /4-4/).¹⁸ Additionally, syllable structure plays a significant role. The final tone /4/ in a stem with /4-4/ is elided, as expected, if the syllable structure is CVV or CV?V but maintained in disyllabic roots (e.g., $nda^4ta^4=^2$ ‘I split (something) in two’).¹⁹

4.2. Tone and the marking of aspect/mood.

Verbs in YM inflect for incomplete and complete aspect and for irrealis mood. There is also an inflectional form for the negative of verbs in this mood and, conditionally, in the two aspects. The language has two alternative forms for the complete, which for convenience we call CPL-1 and CPL-2. Two other occasional verb forms, stative and progressive, will not be studied here as they are relatively rare and in many cases irregular in form. Table 5 offers paradigms of four representative verbs.

¹⁸ Note that if the tonal melody is /1-1/ then the enclitic $=yu^2$ is used to mark the first person.

¹⁹ A search through over one hundred hours of transcribed natural speech recordings reveals that other factors may affect the behaviour (maintenance or elision) of stem-final tones before the 1st person enclitic: natural vs. elicited speech, rapidity of utterance, speaker idiosyncracies, and free variation.

Table 5. The verbal paradigm of four exemplary verbs in YM.

	‘hang’ (tr)	‘drag’ (tr)	‘break’ (tr)	‘boil’ (intr)
IRR	chi ³ kun ²	ku ³ +ñu ³ u ³	taʔ ³ bi ⁴	kwi ¹ so ¹
NEG.IRR	chi ¹⁴ kun ²	ku ¹⁴ +ñu ³ u ³	taʔ ¹⁴ bi ⁴	kwi ¹⁴ so ¹
CPL-1	ni ¹ -chi ³ kun ²	ni ¹ -ju ³ +ñu ³ u ³	ni ¹ -taʔ ³ bi ⁴	ni ¹ -si ¹ so ¹
CPL-2	chi ¹³ kun ²	ju ¹³ +ñu ³ u ³	taʔ ¹³ bi ⁴	si ¹ so ¹
INCPL	chi ⁴ kun ²	ju ⁴ +ñu ³ u ³	taʔ ⁴ bi ⁴	si ⁴ so ¹
STAT	ndi ⁴ kun ²	---	taʔ ⁴ bi ⁴	---
PROG	chi ⁴ +ndi ³ kun ²	ñu ⁴ u ⁴	---	---

Tone plays a fundamental role in marking aspect/mood in YM verbs. The completive CPL-1, with the prefix *ni*¹-, is the only inflected form built by segmental affixation. We take the segments and tonal melody of the CPL-1 stem as representing the basic lemma of the verb. In most cases the tonal melody of the irrealis matches that of CPL-1 although in a few cases (§4.3.3) it is distinct. The following section explores the role of tonal variation in marking aspect and mood.

4.2.1. Inflectional tone for the CPL-2.

The two alternative completive forms (CPL-1 and CPL-2) appear to be in free variation.²⁰ While the form for CPL-1 is built by prefixing *ni*¹- to the base stem, CPL-2 is realized simply by adding a low tone /1/ to the lexical tone on μ 1 of the base. The inflectional tone /1/ of CPL-2 has a lexical origin: the prefix *ni*¹-. When the base has tone /3/ on μ 1, (55% of bimoraic verbs [156 out of 282] and 98% of trimoraic ones [266 out of 272]), the result is an ascending tone /13/ for the CPL-2, as in (14a) and (14b).

- (14)
- | | | | |
|----|---|---|-----------------|
| | CPL-1 | CPL-2 | |
| a. | ni ¹ -chi ³ chin ⁴ | chi ¹³ chin ⁴ | (intr) ‘suckle’ |
| | ni ¹ -kaʔ ³ an ⁴ | kaʔ ¹³ an ⁴ | (tr) ‘believe’ |
| b. | ni ¹ -chi ³ +ndaʔ ³ a ⁴ | chi ¹³ +ndaʔ ³ a ⁴ | (tr) ‘push’ |
| | ni ¹ -ku ³ +i ³ ni ² | ku ¹³ +i ³ ni ² | (tr) ‘love’ |

The same rule applies to causative verbs with the prefix *sa*⁴-, but for such verbs the CPL-2 that results is homophonous with the negative irrealis, which also bears the inflectional tone /14/ (15).

- (15)
- | | | | | |
|--|--|--|--|--------------|
| | CPL-1 | CPL-2 | NEG.IRR | |
| | ni ¹ -sa ⁴ -naʔ ¹ a ¹ | sa ¹⁴ -naʔ ¹ a ¹ | sa ¹⁴ -naʔ ¹ a ¹ | (tr) ‘teach’ |
| | ni ¹ -sa ⁴ -ka ³ sun ² | sa ¹⁴ -ka ³ sun ² | sa ¹⁴ -ka ³ sun ² | (tr) ‘fry’ |

Completive tone /1/ may be present, though not overtly manifested, on stems with lexical tones /1/ or /14/ on μ 1. As a result, the tonal melodies of the CPL-2 and the irrealis of verbs with /1/ or /14/ on μ 1 are homophonous (16). Nevertheless, a significant number of verbs have irrealis forms whose segments are distinct from those of the lexical stem (the stem

²⁰ This could be taken as canonical instances of overabundance (Thornton 2011).

of the CPL-2) (see §4.3). In cases of lexical tones /1/ or /14/ on $\mu 1$, this segmental variation maintains the formal distinction between the irrealis and CPL-2 despite the fact that the tonal melodies for the two forms are identical.

(16)	CPL-1	CPL-2	IRR		
	ni ¹ -ka ¹ ba ¹	ka ¹ ba ¹	ka ¹ ba ¹	(intr)	‘turn’
	ni ¹ -tu ¹ +xu ¹ ? ⁴ u ²	tu ¹ +xu ¹ ? ¹⁴ u ²	tu ¹ +xu ¹ ? ⁴ u ²	(intr)	‘get hurt’
	ni ¹ -xi ¹⁴ ta ³	xi ¹⁴ ta ³	xi ¹⁴ ta ³	(tr)	‘pull’
	ni ¹ -si ¹⁴ +kwe ¹ kun ¹	si ¹⁴ +kwe ¹ kun ¹	si ¹⁴ +kwe ¹ kun ¹	(tr)	‘spread a disease to (sb)’

4.2.2. Inflectional tone for the incomplete.

In the default situation, the form for the incomplete aspect is built by overwriting the lexical tone on $\mu 1$ with high tone /4/. In (17) instances of CPL-1 are given alongside the incomplete to provide a reference for lexical tone of the stem.

(17)	CPL-1	INCPL		
a.	ni ¹ -chi ³ chin ⁴	chi ⁴ chin ⁴	(intr)	‘suckle’
	ni ¹ -ka ³ an ⁴	ka ⁴ an ⁴	(tr)	‘believe’
	ni ¹ -ku ³ +i ³ ni ²	ku ⁴ +i ³ ni ²	(tr)	‘love’
	ni ¹ -ka ³ +xi ⁴ ta ³	ka ⁴ +xi ⁴ ta ³	(tr)	‘grind’
b.	ni ¹ -ka ¹ an ¹	ka ⁴ an ¹	(intr)	‘talk’
	ni ¹ -nda ¹ yu ¹	nda ⁴ yu ¹	(intr)	‘confess’
	ni ¹ -tu ¹ +xu ¹ ? ⁴ u ²	tu ⁴ +xu ¹ ? ⁴ u ²	(tr)	‘get hurt’

As causatives already have a tone /4/ on $\mu 1$, which is lexically associated with the prefix *sa⁴-*, the incomplete is indistinguishable in surface form from the irrealis (18).

(18)	IRR	INCPL		
	sa ⁴ -ndo ³ to ³	sa ⁴ -ndo ³ to ³	(tr)	‘wake up’
	sa ⁴ -ndu ¹ xin ¹	sa ⁴ -ndu ¹ xin ¹	(tr)	‘bury’

With level tones in a bimoraic stem, the formation of the incomplete is quite regular, although in some cases there is a pattern split depending on the syllabic structure of the verbal stem. This is demonstrated by the examples in table 6. Note that there are no YM words with /3-1/ tones.

Table 6. Tone allomorphy for the incompleteive.

Syllable structure	LEX	INCP	CPL-1	INCPL	
a disyllabic	/1-1/	> /4-1/	ni ¹ -ki ¹ xin ¹	ki ⁴ xin ¹	‘fall asleep’
monosyllabic			ni ¹ -tu ¹ un ¹	tu ⁴ un ¹	‘catch fire, light up’
b disyllabic	/1-3/	> /4-13/	ni ¹ -ka ¹ ku ³	ka ⁴ ku ¹³	‘escape’
monosyllabic			ni ¹ -ka ¹ an ³	ka ⁴ an ¹³	‘get accustomed’
c disyllabic	/1-4/	> /4-14/	ni ¹ -ka ¹ xan ⁴	ka ⁴ xan ¹⁴	‘sneeze’
monosyllabic			ni ¹ -ku ¹ un ⁴	ku ⁴ un ¹⁴	‘for chilli to be ground into sauce’
d.1 disyllabic	/3-3/	> /4-3/	ni ¹ -ka ³ ba ³	ka ⁴ ba ³	‘lie down to sleep’
			ni ¹ -nda ³ ba ³	nda ⁴ ba ³	‘fall’
d.2 monosyllabic	/3-3/	> /4-4/	ni ¹ -chi ³ i ³	chi ⁴ i ⁴	‘get wet’
			ni ¹ -ka ³ a ³	ka ⁴ a ⁴	‘emit a sound’
			ni ¹ -ku ³ u ³	ku ⁴ u ⁴	‘occur, happen’
			ni ¹ -chi ³ i ³	chi ⁴ i ⁴	‘harvest’ (tr)
e.1 disyllabic	/3-4/	> /4-4/	ni ¹ -ku ³ chi ⁴	ku ⁴ chi ⁴	‘feel sad’ ²¹
			ni ¹ -ka ³ ba ⁴	ka ⁴ ba ⁴	‘turn’ (tr.)
e.2 monosyllabic	/3-4/	> /4-24/	ni ¹ -ka ³ a ⁴	ka ⁴ a ²⁴	‘slip’
			ni ¹ -ku ³ un ⁴	ku ⁴ un ²⁴	‘grind [chilli] for sauce’

The preceding examples reveal interesting, though regular, patterns. If the lexical tone has /1/ on μ 1 then /4/ is assigned to μ 1 and the lexical tone /1/ on μ 1 is assigned to μ 2. This can be seen most clearly in (b) and (c) whose outcomes result in a rising tone /13/ or /14/ on μ 2. When the lexical tone of μ 2 is also /1/, it remains unchanged in the incompleteive (a).

If the lexical tone of μ 1 is /3/ then a split pattern develops depending on the syllabic structure of the stem. With disyllabic stems, the incompleteive is formed by simply assigning /4/ to μ 1; there is no change in the lexical tone of μ 2 (d.1/e.1). If the stem is monosyllabic (CVV or CV?V), then for lexical melodies /3-3/ the incompleteive is /4-4/, an outcome that can be accounted for by positing a single lexical tone /3/ that spreads to both morae in the lexical base. The same spreading would occur when the single lexical tone is overwritten by inflectional tone /4/. If the lexical tonal melody is /3-4/ for disyllabic verbs the tone of μ 1 is simply raised to /4/. In monosyllables, however, the mid tone /3/ on μ 1 is pushed to μ 2 and lowered to /2/ in the context of surrounding high tones (a rising /34/ tone is not found in YM) resulting in a /4-24/ tonal melody.

A final interesting incompleteive formation involves the few irrealis stems that have a lexical tone /14/ on μ 1 (for a complete list, see table 7 below). Such stems require the incompleteive prefix i^4 - if the verb is bimoraic, as shown in (19a) and table 7.²² But with trimoraic verbs, tone /4/ overwrites the lexical tone, as shown in (19b). Like other inflectional tones, tone /4/ for the incompleteive is the reflex of a segmental form, in this case the archaic incompleteive prefix i^4 -, only observable nowadays in this restricted prosodic context of initial /14/ in lexical stems.

²¹ In collocation with the noun i^3ni^2 ‘heart’.

²² One verb has a suppletive incompleteive form that begins with /i/: LEX.STEM $jo^3nde^3e^3$ ‘sit down’ (PL subj.) > INCPL $i^4nde^4e^4$. Three other bimoraic verbs have an initial /i/ in their lexical stems, none of which have an initial /14/ tone: LEX.STEM $i^3?in^3$ ‘scratch’ (INCPL i^4in^3); LEX.STEM i^4chi^1 ‘dry up (something alive, such as a plant)’ (INCPL i^4chi^1); LEX.STEM i^3xa^3 ‘do’ (INCPL i^4xa^3).

(19)	CPL-1	INCPL	
a.	ni ¹ -ki ¹⁴ tu ³	i ⁴ -ki ¹⁴ tu ³	(intr) ‘dawn’
	ni ¹ -ta ¹⁴ ni ³	i ⁴ -ta ¹⁴ ni ³	(intr) ‘get bruised’ (fruit)
	ni ¹ -ti ¹⁴ bi ³	i ⁴ -ti ¹⁴ bi ³	(intr) ‘rotten’
	ni ¹ -chu ¹⁴ tu ²	i ⁴ -chu ¹⁴ tu ²	(tr) ‘kiss’
b.	ni ¹ -xo ¹⁴ +kwi ¹ in ¹	xo ⁴ +kwi ¹ in ¹	(intr) ‘turn around to look’
	ni ¹ -si ¹⁴ +kwe ¹ kun ¹	si ⁴ +kwe ¹ kun ¹	(tr) ‘spread a disease to (someone)’

This incompletive prefix *i*⁴- in YM provides an example of the retention of a historical form of a bound prefix to mark the continuative, a morpheme discussed by McKendry (2013:80).²³

“The imperfective prefix provides an example of the process whereby CV segments are lost, but the tones remain as floating tones. In most varieties the difference between the irrealis and the imperfective forms of verbs is the presence of a High tone in the imperfective. Hollenbach (2001) posits that this floating High tone is all that remains of a verbal morpheme which up to colonial times had CV segments.”

McKendry (2013:80) goes on to say that the historical prefix form is *yo*, attested in Alvarado (1962 [1593]) as in the following example.

(20)	yo -sasi=ndi
	IPFV-eat=I
	‘I’m eating.’

Finally, there are at least two verbs in our sample that have an irregular tonal outcome in the incompletive (21a). Another irregular verb (21b) has the unexpected historical incompletive marked *i*⁴- despite lacking the initial /14/ lexical tonal melody that otherwise motivates the use of this prefix.

(21)	CPL-1	INCPL	Expected	
a.	ni ¹ -kaŋ ¹ an ¹	kaŋ ⁴ an ²	*kaŋ ⁴ an ¹	(intr) ‘talk’
	ni ¹ -sa ¹ a ⁴	sa ⁴ a ²⁴	*sa ⁴ a ¹⁴	(intr) ‘get upset’ ²⁴
b.	ni ¹ -jo ³ nde ³ e ³	(i ⁴ -)nde ⁴ e ⁴	*jo ⁴ nde ³ e ³	(intr) ‘sit down’ (PL sub.)

²³ The same incompletive prefix is also found Juxtlahuaca Mixtec (Ramírez and Beatham, 2012:4), e.g. *i-ndú’ú=ra* ‘he’s sitting down.’ We are indebted to Lucien Carroll for bringing McKendry’s observation and the Juxtlahuaca examples to our attention.

²⁴ There are eight monosyllabic verbs (seven intransitives and one transitive) that have /1-4/ lexical tone. All but *sa¹a⁴* (‘get upset’) form the incompletive with /4-14/, as expected (see examples in table 8). However, there are two verbs *sa¹a⁴* (‘get heated up’ [e.g., a boiled liquid] and ‘get upset’) that are homophonous in the irrealis though distinct in the incompletive: *sa⁴a¹⁴* ‘get heated up’ [a liquid] and *sa⁴a²⁴* ‘get upset’. The two verbs would seem related as distinct senses of the same lemma. Whether the irregular incompletive tonal melody of one sense (*sa⁴a²⁴* ‘get upset’) can be ascribed to a disambiguating function is, however, unclear.

4.2.3. Inflectional tone for the negative: Irrealis, incomplete, complete.

Negation in YM can be marked inflectionally by means of tone on verbs in the irrealis, complete, and, less commonly, the incomplete. In cases in which negation cannot be marked by tone a negative adverb is used. With the incomplete, at times both tonal and syntactic marking of negation can occur with the same verb stem (table 8, below).

Negation of the irrealis and complete through tone is shown in (22) and (23). For the irrealis, negation is realized by overwriting the lexical tone on $\mu 1$, be it /1/ or /3/, by an ascending tone /14/. This occurs regardless of whether the verb has a bimoraic stem as in (22a) or a trimoraic one, as in (22b), or even in causatively derived verbs with the prefix sa^4 -, as in (22c).

(22)	IRR	NEG.IRR		
a.	cho [?] ma ⁴	cho ¹⁴ ma ⁴	(tr)	'squash'
	ka [?] an ¹	ka [?] an ¹	(intr)	'talk'
b.	ka ³ +xi ⁴ ta ³	ka ¹⁴ +xi ⁴ ta ³	(tr)	'grind'
	tu ¹ +xu [?] u ²	tu ¹⁴ +xu [?] u ²	(tr)	'get hurt'
c.	sa ⁴ -na [?] a ¹	sa ¹⁴ -na [?] a ¹	(tr)	'teach'
	sa ⁴ -ka ³ sun ²	sa ¹⁴ -ka ³ sun ²	(tr)	'fry'

Note that despite the fact that in causative constructions with sa^4 - the irrealis and incomplete are formally indistinct, negation through a rising tone is limited to the irrealis (23) whereas the negative of the incomplete is marked by the adverb ba^{143} .

(23)	IRR	NEG.IRR	INCPL	NEG.INCPL	
	sa ⁴ -chi ^{3:3} i ³	sa ¹⁴ -chi ^{3:3} i ³	sa ⁴ -chi ^{3:3} i ³	ba ¹⁴³ sa ⁴ -chi ^{3:3} i ³	(intr) 'make wet'

In the causative, then, the irrealis and incomplete utilize distinct strategies to mark the negative: tonal inflection for the irrealis, syntactic structures for the incomplete. This distinction suggests that despite the examples in tables 7 and 8, the prototypical markers of negation are tonal for the irrealis and segmental for the incomplete.

Negation of complete aspect only occurs with CPL-1 form, in which the complete aspect is marked by the prefix ni^1 -. The tonally marked CPL-2 form cannot be negated, either through tone or by a preceding lexical element. For CPL-1 negation is realized in one of two ways. The most common (1385 of a total of 1574 corpus occurrences; 88 percent) is with ni^{14} -, applying the /14/ tonal marker of negation to the prefix. An alternative form is syntactic, using the element ba^{143} (189 cases in the corpus; 12 percent). After ba^{143} , most commonly used to negate the incomplete (see below), the tone of the complete prefix ni^1 - is raised to ni^4 -.

(24)	CPL-1	NEG.CPL-1 WITH TONAL MARKING	NEG.CPL-1 WITH SYNTACTIC MARKING AND RAISED TONE	
	ni ¹ -na [?] ma ¹	ni ¹⁴ -na [?] ma ¹	ba ¹⁴³ ni ⁴ -na [?] ma ¹	(intr) 'confess'
	ni ¹ -su ³ ma ³	ni ¹⁴ -su ³ ma ³	ba ¹⁴³ ni ⁴ -su ³ ma ³	(intr) 'go backwards'
	ni ¹ -ka ³ chi ²	ni ¹⁴ -ka ³ chi ²	ba ¹⁴³ ni ⁴ -ka ³ chi ²	(tr) 'say'

For irrealis stem verbs with lexical tone /14/ on $\mu 1$, however, negation is marked syntactically by means of the negative adverb *kwa*¹⁴, as shown in table 7. Note in table 7 that six verbs with initial /14/ have an alternate form. The alternative irrealis forms *xi*⁴*ko*², *xi*⁴*ta*³, *ya*⁴*kun*², and *yu*³*bi*² apparently can occur only after the negative marker *kwa*¹⁴ (i.e., the affirmative irrealis must have tone /14/ on $\mu 1$). However, two irregular forms, *cha*⁴*bi*³ and *chu*⁴*tu*², can be used in the affirmative, that is, even if not preceded by the negative marker *kwa*¹⁴. As pointed out in (19.a) above, the verbs in table 7 are those whose incomplete form is marked by the prefix *i*⁴-. It is to facilitate the visualization of this pattern that we include their incomplete forms here.²⁵

Table 7. The negative of irrealis stems with /14/ on $\mu 1$.

IRR	NEG.IRR	Alternative NEG.IRR	INCPL	
<i>ki</i> ¹⁴ <i>tu</i> ³ / <i>ni</i> ¹ <i>ki</i> ¹⁴ <i>tu</i> ³	<i>kwa</i> ¹⁴ <i>ki</i> ¹⁴ <i>tu</i> ³	----	<i>i</i> ⁴ - <i>nki</i> ¹⁴ <i>tu</i> ³	‘dawn’
<i>chu</i> ¹⁴ <i>ma</i> ¹	<i>kwa</i> ¹⁴ <i>chu</i> ¹⁴ <i>ma</i> ¹	----	<i>i</i> ⁴ - <i>chu</i> ¹⁴ <i>ma</i> ¹	‘be incensed’
<i>ta</i> ¹⁴ <i>ni</i> ³	<i>kwa</i> ¹⁴ <i>ta</i> ¹⁴ <i>ni</i> ³	----	<i>i</i> ⁴ - <i>ta</i> ¹⁴ <i>ni</i> ³	‘get bruised’ (fruit)
<i>ti</i> ¹⁴ <i>bi</i> ³	<i>kwa</i> ¹⁴ <i>ti</i> ¹⁴ <i>bi</i> ³	----	<i>i</i> ⁴ - <i>ti</i> ¹⁴ <i>bi</i> ³	‘get broken’ (a machine)
<i>xa</i> ¹⁴ <i>bi</i> ²	<i>kwa</i> ¹⁴ <i>xa</i> ¹⁴ <i>bi</i> ²	----	<i>i</i> ⁴ - <i>xa</i> ¹⁴ <i>bi</i> ²	‘get tired’
<i>xa</i> ¹⁴ <i>ni</i> ²	<i>kwa</i> ¹⁴ <i>xa</i> ¹⁴ <i>ni</i> ²	----	<i>i</i> ⁴ - <i>xa</i> ¹⁴ <i>ni</i> ²	‘dream’
<i>xa</i> ¹⁴ <i>ta</i> ²	<i>kwa</i> ¹⁴ <i>xa</i> ¹⁴ <i>ta</i> ²	----	<i>i</i> ⁴ - <i>xa</i> ¹⁴ <i>ta</i> ²	‘shave’ (sb’s head)
<i>xi</i> ¹⁴ <i>nda</i> ²	<i>kwa</i> ¹⁴ <i>xi</i> ¹⁴ <i>nda</i> ²	----	<i>i</i> ⁴ - <i>xi</i> ¹⁴ <i>nda</i> ²	‘carve’
<i>xi</i> ¹⁴ <i>ni</i> ³	<i>kwa</i> ¹⁴ <i>xi</i> ¹⁴ <i>ni</i> ³	----	<i>i</i> ⁴ - <i>xi</i> ¹⁴ <i>ni</i> ³	‘rub’
<i>xi</i> ¹⁴ <i>ñu</i> ³	<i>kwa</i> ¹⁴ <i>xi</i> ¹⁴ <i>ñu</i> ³	----	<i>i</i> ⁴ - <i>xi</i> ¹⁴ <i>ñu</i> ³	‘patch up’
<i>xio</i> ¹⁴ <i>o</i> ⁴	<i>kwa</i> ¹⁴ <i>xio</i> ¹⁴ <i>o</i> ⁴	----	<i>i</i> ⁴ - <i>xio</i> ¹⁴ <i>o</i> ⁴	‘become sick from wanting a food’
<i>cha</i> ¹⁴ <i>bi</i> ³ / <i>cha</i> ⁴ <i>bi</i> ³	<i>kwa</i> ¹⁴ <i>cha</i> ¹⁴ <i>bi</i> ³ <i>kwa</i> ¹⁴ <i>cha</i> ⁴ <i>bi</i> ³	<i>cha</i> ⁴ <i>bi</i> ³	<i>i</i> ⁴ - <i>cha</i> ¹⁴ <i>bi</i> ³ <i>i</i> ⁴ - <i>cha</i> ⁴ <i>bi</i> ³ <i>cha</i> ⁴ <i>bi</i> ³	‘pay’
<i>chu</i> ¹⁴ <i>tu</i> ² / <i>chu</i> ⁴ <i>tu</i> ²	<i>kwa</i> ¹⁴ <i>chu</i> ¹⁴ <i>tu</i> ² <i>kwa</i> ¹⁴ <i>chu</i> ⁴ <i>tu</i> ²	<i>chu</i> ⁴ <i>tu</i> ²	<i>i</i> ⁴ - <i>chu</i> ¹⁴ <i>tu</i> ²	‘kiss’
<i>xi</i> ¹⁴ <i>ko</i> ³	<i>kwa</i> ¹⁴ <i>xi</i> ¹⁴ <i>ko</i> ³	<i>xi</i> ⁴ <i>ko</i> ³	<i>i</i> ⁴ - <i>xi</i> ¹⁴ <i>ko</i> ³	‘sell’
<i>xi</i> ¹⁴ <i>ta</i> ³	<i>kwa</i> ¹⁴ <i>xi</i> ¹⁴ <i>ta</i> ³ <i>kwa</i> ¹⁴ <i>xi</i> ⁴ <i>ta</i> ³	<i>xi</i> ⁴ <i>ta</i> ³	<i>i</i> ⁴ - <i>xi</i> ¹⁴ <i>ta</i> ³ <i>i</i> ⁴ - <i>xi</i> ⁴ <i>ta</i> ³	‘pull’
<i>ya</i> ¹⁴ <i>kun</i> ²	<i>kwa</i> ¹⁴ <i>ya</i> ¹⁴ <i>kun</i> ² <i>kwa</i> ¹⁴ <i>ya</i> ⁴ <i>kun</i> ²	<i>ya</i> ⁴ <i>kun</i> ²	<i>i</i> ⁴ - <i>ya</i> ¹⁴ <i>kun</i> ² <i>i</i> ⁴ - <i>ya</i> ⁴ <i>kun</i> ²	‘massage’
<i>yu</i> ¹⁴ <i>bi</i> ²	<i>kwa</i> ¹⁴ <i>yu</i> ¹⁴ <i>bi</i> ² <i>kwa</i> ¹⁴ <i>yu</i> ³ <i>bi</i> ²	<i>yu</i> ³ <i>bi</i> ²	<i>i</i> ⁴ - <i>yu</i> ¹⁴ <i>bi</i> ²	‘get scared’

The negative adverb *kwa*¹⁴ in YM is used only before the irrealis. Comparative evidence from other Mixtec languages strongly suggests that this marker is the reflex of a historical irrealis marker that is still observable in other varieties as an optional or contextually conditioned marker, with various degrees of phonological independence: *kwa*¹ in San Juan Colorado (Stark Campbell et al. 1986:163) (see also table 13 below), *ku* in Jamiltepec (Johnson 1988:102), *kūn* in Ocotepéc (Alexander 1988:251), or the prefixes *kw-* or *kV-* in

²⁵ Note the verb *i*⁴-*nki*¹⁴*tu*³, which is based on the contracted trimoraic stem *ni*¹*ki*¹⁴*tu*³, an alternate of bimoraic stem *ki*¹⁴*tu*³ ‘dawn’. This suggests that an initial /14/ tone in bimoraic stems such as the ones in table 7 might be historically related to a conflation of two independent level tones /1/ and /4/ realized over the first two morae of historically prior trimoraic verbs.

Coatzospan (Small 1990:398). Both the independent word and the fused prefix are undoubtedly related to the segmental alternations discussed in §4.3 and go back to the historical prefixes **ka-* and **ku-* reconstructed by Kaufman (cited in Macaulay 1996:48) as the allomorphs for the irrealis in Proto-Mixtec.

The other principle independent negative marker in YM is *ba*¹⁴³, which is most commonly used to negate a verb in the incomplete, as in (25).²⁶

- (25) *ba*¹⁴³ *kaʔan*²=*yu*¹
 NEG INCPL.SPEAK=1SG
 ‘I do not speak.’

A few incomplete verbs, however, can also accept tonal marking (/14/) of negation. The verbs that have been identified as accepting tonal as well as segmental marking of negation all have an incomplete stem that is segmentally different from that of the irrealis (for more details on segmental alternations in verb stems, see the following section). Table 8 offers data on the frequency of this alternative marking for four verbal lemmas of this type based on Amith and Castillo García's large corpus of YM texts.²⁷ Notice that the first and fourth verbs have alternative stems for the incomplete at a lexical level with no difference in meaning. The use of the negative form of the incomplete varies greatly depending on the lexical item. For example, for the verb *ku*³*ni*³ ‘know’, tonal marking of the negative incomplete is found 1,394 times, whereas the syntactic alternative by means of *ba*¹⁴³ is only found in only 22 cases. Both options, inflectional vs. the syntactic negation, are used with equal frequency for the verb *kwi*³*in*³ ‘accept’, but for the verbs *kwa*^ʔ*a*³ ‘permit’ or *ko*³*to*³ ‘see’, the tonal encoding is less favoured.

Table 8. Incomplete verbs with negation marked by tone /14/:

IRR	INCPL	Corpus occurrences of affirmative INCPL	NEG.INCPL	Corpus occurrences of NEG.INCPL	<i>ba</i> ¹⁴³
<i>ku</i> ³ <i>ni</i> ³ ‘know’	<i>ji</i> ⁴ <i>ni</i> ²	3,483	<i>ji</i> ¹⁴ <i>ni</i> ²	1,394	22
	<i>xi</i> ⁴ <i>ni</i> ²	298	<i>xi</i> ¹⁴ <i>ni</i> ²	261	
	<i>ji</i> ⁴ <i>ni</i> ³	119	<i>ji</i> ¹⁴ <i>ni</i> ³	3	
	<i>xi</i> ⁴ <i>ni</i> ³	45	<i>xi</i> ¹⁴ <i>ni</i> ³	1	
<i>kwi</i> ³ <i>in</i> ³ ‘accept’	<i>xi</i> ⁴ <i>in</i> ⁴	81	<i>xi</i> ¹⁴ <i>in</i> ⁴	59	60
<i>kwa</i> ^ʔ <i>a</i> ³ ‘permit’	<i>xa</i> ^ʔ <i>a</i> ¹³	175	<i>xa</i> ^ʔ <i>a</i> ^{14,13}	24	86
<i>ko</i> ³ <i>to</i> ³ ‘see’	<i>xi</i> ⁴ <i>to</i> ³	146	<i>xi</i> ¹⁴ <i>to</i> ³	2	6
	<i>ji</i> ⁴ <i>to</i> ³	419	<i>ji</i> ¹⁴ <i>to</i> ³	1	11

In this section we have examined the use of tone in YM as an inflectional exponent of aspect, mood and polarity. Inflectional tones in this system work as prosodic affixes with a remarkable consistency in the form-meaning mapping of inflection. Before we compare the

²⁶ Notice that both *ba*¹⁴³ and the negative irrealis marker *kwa*¹⁴ have the same tone /14/ characteristic of other negative forms in YM.

²⁷ These four verbs are not the only ones that accept tonal marking of negation in the incomplete. They are simply those for which such tonal marking is most frequently found in the corpus. Although not documented in the corpus, according to the judgement of Castillo García other verbs also accept tonal marking of negation in the incomplete: *ka*³*xi*⁴ IRR, *xa*⁴*xi*²⁴ INCPL, *xa*¹⁴*xi*²⁴ NEG INCPL ‘eat’, ‘bite into’; and *xi*^ʔ*in*¹³ INCPL, *xi*^ʔ*in*¹³ NEG INCPL ‘leak’ (a house roof) (this verb does not have an irrealis form).

behaviour of tone in YM with that found in other Mixtec languages, in the next section we introduce other relevant aspects of the inflectional morphology of YM that involve segmental alternations on the stem.

4.3. Stem alternation patterns in verbal morphology.

In addition to tone, segmental stem alternations also play an important role in YM verbal inflection. Most verbs, here called "invariant verbs", maintain segments constant throughout their paradigms, as for example the verbs $ku^3ki^4bi^3$ 'be a nuisance' and $xi^3kwi^4na^4$ 'steal' in table 9. Other verbs, here called "variant verbs", may have two segmentally distinct stems: $ku^3ka^3an^3$ 'be ashamed', for example, has one stem for the irrealis mood (and for the negative irrealis) and another for the incomplete and complete aspects. The same stem formatives (e.g., $*ku-$ in table 10) may be found with either invariant or variant verbs. This type of segmental variation is very common in YM and in Mixtec languages in general. But it is still poorly understood and further study is needed to understand any possible conditioning factors.

Table 9. Invariant and variant verbs in YM.

	Invariant verbs (intr) 'be a nuisance'	(tr) 'steal'	Variant verbs (intr) 'be ashamed'
IRR	$ku^3+ki^4bi^3$	$xi^3+kwi^4na^4$	$ku^3+ka^3an^3$
NEG.IRR	$ku^{14}+ki^4bi^3$	$xi^{14}+kwi^4na^4$	$ku^{14}+ka^3an^3$
CPL-1	$ni^1 - ku^3+ki^4bi^3$	$ni^1 - xi^3+kwi^4na^4$	$ni^1 - xi^3+ka^3an^3$
CPL-2	$ku^{13}+ki^4bi^3$	$xi^{13}+kwi^4na^4$	$xi^{13}+ka^3an^3$
INCPL	$ku^4+ki^4bi^3$	$xi^4+kwi^4na^4$	$xi^4+ka^3an^3$

Most YM verbs are invariant: 89 percent of our sample verbs are of this type (495 of 554).²⁸ The remaining 109 are variant. Such verbs appear to be remnants of an older system in which the stem formatives involved in the building of the irrealis stem were once irrealis markers of some sort. Macaulay (1996:48) makes this point and cites a manuscript by Terrence Kaufman in which he reconstructs the proto-Mixtec prefixes $*xi-$ (durative), $*ka-$ (irrealis), and $*ku-$ (also irrealis) as evidence for the historical basis of the $xi/ku-$ alternation noted in many Mixtec languages. These same archaic stem formatives are evident in YM. At some point this situation became morphologically opaque, giving rise to the invariant~variant verb patterns now in evidence. For some verbs, the irrealis stem generalized to the entire paradigm (e.g., $ku^3ki^4bi^3$ 'be a nuisance') whereas for other verbs it was the stem bearing Kaufman's 'durative' $*xi-$ that generalized (e.g., $xi^3kwi^4na^4$ 'steal').

Note that in the case of *invariant verbs* with lexical tone /1/ or /14/ on $\mu 1$, the irrealis and CPL-2 forms are indistinct (table 10, first column). This homophony is avoided, however, with *variant verbs* as in these cases the irrealis stem is not identical to the lexical stem of the incomplete or complete (table 10, second column):

²⁸ As pointed out above, our sample does not include any causative verb with the prefix sa^4- .

Table 10. Homophony between irrealis and CPL-2.

	Invariant (tr) 'sew'	Variant (tr) 'ask for'	Initial /14/ 'dream'
IRR	> ki ¹ ku ³	ka ¹ kan ¹	xa ¹⁴ ni ²
CPL-2	> ki ¹ ku ³	xi ¹ kan ¹	xa ¹⁴ ni ²

Of the 109 variant verbs in our sample, 101 (93%) fall into two inflectional classes attending to the proposed stem formative of the irrealis: *ku+* (82 cases) or *ka+* (19 cases). The remaining eight verbs are irregular to some degree and are treated separately. The distribution of the classes in our sample is given in (26).

(26)

		<i>ku+</i>	<i>ka+</i>	TOTAL
Bimoraic	intr	29	3	
	tr	13	10	
Trimoraic	intr	35	6	
	tr	5	0	
TOTAL		82	19	101

The following sections analyze the patterns of variation manifested in the 109 variant verbs of our sample.

4.3.1. The *ku+* stem class.

Eighty-two verbs in the sample have a stem change to initial *ku+* in the irrealis, e.g. *chi+chi* /1-3/ 'mature, ripen' > IRR.STEM *ku+chi*. We refer to this variable segmental portion of the stems as the stem formative (indicated by the plus sign +). The unstressed /u/ in the formative *ku+* surfaces as [o] when the stem has a tonic mid vowel, either /o/ (*xi+to* /3-3/ 'look' > IRR.STEM *ko+to* / ku+to/) or /e/ (*jo+se'e* / ju+se?e/ 'hide' /3-4-2/ > IRR.STEM *ko+se?e* /ku+se?e/). Similarly, *ku+* is labialized to [kw]²⁹ when associated to a non-back initial stem vowel (e.g. *ch+achi* /3-3/ 'be torn apart' > IRR.STEM *ku+achi* [k^wachi]). Representative examples of the *ku+* stem class are given in (27). Verbs with variable lexical stems are illustrated in (27b). In a few cases the irrealis is built by adding *ku+* to a verb lacking a stem formative in the lexical form (27c).

(27) The *ku+* class

	LEX.STEM	IRR.STEM	TONE		
a.	cha+achi	ku+achi	/3-3/	(intr)	'be torn apart'
	chi+chi	ku+chi	/1-3/	(intr)	'mature, ripen'
	ja+nu?u	ku+nu?u	/1-1-4/	(intr)	'go back to one's place' ³⁰
	ji+ni	ku+ni	/3-2/	(tr)	'see'
	jo+ndaa	ko+ndaa	/3-2-2/	(tr)	'look after'
	ju+nda?a	ku+nda?a	/1-1-3/	(intr)	'remove oneself (from place)'
	ju+eta	ku+eta	/3-3/	(intr)	'be measured'
	ki+xin	ku+sun	/1-1/	(intr)	'sleep'

²⁹ Labialization and palatalization commonly occur before enclitics: /Cu/, and sometimes /Co/, is labialized before non-back vowels and /Ci/ is palatalized before non-front vowels.

³⁰ Alternative stem: *kwa¹nu²u⁴*.

	si+iso	ku+iso	/1-1/	(intr)	‘come to a boil’
	xa+aʔa	ku+aʔa	/1-3/	(dtr)	‘give’
	xi+iin	ku+iin	/1-1/	(intr)	‘copulate’
	xi+iko	ku+iko	/3-4/	(tr)	‘carry’
	xi+kaʔan	ku+kaʔan	/3-3-3/	(intr)	‘be ashamed’
	xu+xa	ku+xa	/3-3/	(intr)	‘become an adult’
b.	xi+to/ji+to	ko+to	/3-3/	(intr)	‘look’
	ju+ndeta/ndu+ndeta	ku+ndeta	/3-3-3/	(intr)	‘stand up’ (PL sub.)
c.	ndoʔo	ko+ndoʔo	/3-3/	(intr)	‘be the victim of disfortune’
	nani/ju+nani	ku+nani	/(3-)3-2/	(intr)	‘become resolved [a problem]’

4.3.2. The *ka+* stem class.

Nineteen verbs have an initial *ka+* sequence for the irrealis that is not present in the lexical stem (incompletive). For example, *xa+ta* /3-3/ ‘dig out’ is *ka+ta* in the irrealis. As the tone melody is independent from segmental changes, we have disassociated the segments from the tonal structure. Representative examples of *ka+* stem class verbs are given in (28).

(28) The *ka+* class

	LEX.STEM	IRR.STEM			
a.	sa+si	ka+si	/3-2/	(tr)	‘look after cattle’
	xa+ʔnu	ka+ʔnu	/1-1/	(tr)	‘split in two’
	xi+kan	ka+kan	/1-1/	(tr)	‘ask for’
	ja+nduʔu	ka+nduʔu	/3-4-4/	(intr)	‘lie down’
b.	xa+ta/ja+ta	ka+ta	/3-3/	(intr)	‘dig out’
	xa+kwiin/ju+kwiin	ka+kwiin	/3-1-3/	(intr)	‘be left hanging’
	xi+ta/ji+ta	ka+ta	/3-3/	(intr)	‘sing’

We treat the segmental stem of the completive (CPL-1) as the lexical stem. It has a wider distribution in the aspect paradigm, being found in the incompletive as well as the completive. Additionally, its form is more diverse and unpredictable. A number of verbs may have alternative lexical stems, almost invariably manifesting a *x/j*-type of alternation in the historical prefix, such as the one illustrated by the verbs in (28b).

In general, there is little in the lexical stem that indicates with certainty that the verb is a member of the variant class although the phonology of the stem does provide some clues. For example, no invariant verb has a lexical stem with an onset /j/, so verbs such as *ju³+nda³tu³* ‘wait’, *ju³+ndi³xi³* ‘dress’, *ja³+ndu⁴u⁴* ‘lie down’ and *ja³ta²* ‘graze’ can be assumed to be variant, with a different onset segment in the irrealis. Furthermore, in most cases verbs beginning with *ju-* belong to the *ku+* class, and with *ja-* to the *ka+* class. The initial sequences of irrealis stems are less revealing: irrealis stems with /ka/ or /ku/ onsets may or may not be variant: 224 regular verbs in the sample have irrealis stems /ka/ or /ku/ onsets and only 101 of these (43%) are variant. Of the 123 remaining invariant verbs, 59 have a /ka/ onset and 64 a /ku/ onset.³¹

³¹ Like the verbs of the *ku+* class, most of the invariant verbs with an onset in /ku/ are intransitive (50 out of 59). The transitivity profile of verbs having /ka/ is much more mixed.

4.3.3. Irregular verbs.

Finally, eight verbs in the sample of a total of 109 variant verbs are irregular, although most of them could be alternatively analyzed as members of the *ku+* class. The verbs listed in (29) have suppletive irrealis stems that at times also bear tonal melodies that are distinct from those of the lexical stem.

(29)	LEX. STEM	IRR		
a.	i+ ³ xa ³	a+ ³ sa ³	(tr)	‘do’ ³²
	ju ³ +na ³ ni ²	na ³ ni ²	(intr)	‘be able to reach out to grab (something)’
	xi+ʔ ³ i ³	ko+ʔ ³ o ³	(tr)	‘drink’
	xa+ʔ ¹ an ¹	ku+ʔ ¹ un ¹	(intr)	‘go’
b.	xi+ ¹ xi ¹	ko+ ³ ko ³	(intr)	‘get burnt’
	xi+ ¹ yo ³	ko+ ³ o ³	(tr)	‘be (existential)’
	xi+ʔ ¹ i ¹	ku+ ³ u ²	(intr)	‘die’
	xi+ ¹ ka ³	ka+ ³ ka ³	(intr)	‘walk’

To this point we have presented and analyzed tonal and segmental variation in the marking of inflection in YM verb. In the following section, we conclude this article by discussing the place of YM verbal inflection with patterns found within the Mixtec family.

5. Conclusion: Yoloxóchitl Mixtec in a Mixtec context

This paper has discussed tonal and segmental variation in the inflection of verbs in YM. We have shown that in this language tones work as fully fledged inflectional exponents, that is, YM manifest a system of verbal inflection whereby a given tone X is assigned a certain morphosyntactic value Y. The system has little tonal allomorphy overall, and when we find it, especially in the building of the incompletive, the different tonal structures can be accounted for as conditioned by morphophonological properties of the stems. In other words, one does not need to appeal to information encoded in the lexicon to account for the selection of tonal alternants.

We conclude this article by placing the inflectional system of YM within the context of Mixtec languages in general in order to suggest how representative the YM system is considering Mixtec as a language family. The answer is not straightforward. By comparing the YM system to that found in Xochapan Mixtec, we show that both systems share characteristics that we suggest are features of the Guerrero subgroup of Mixtec languages. A very brief excursion into another more distantly related Mixtec language for which sizeable lexical samples exist, such as for example San Juan Colorado Mixtec, reveals that outside the Guerrero subgroup of Mixtec languages, the inflectional system appears to be very different. At this stage, however, we can only suggest possible patterns to explore in Mixtec dialectology.

Xochapan Mixtec (henceforth XM) is a member of the Guerrero subgroup and thus closely related to YM, also a Guerrero Mixtec language. Xochapan Mixtec is spoken by approximately 8,000 people in Xochapa, a village in the municipality of Alcozauca about 60 kilometers north-northeast of Yoloxóchitl. In general, XM bears a strong resemblance to YM though differing in some interesting ways. The dictionary of XM by Stark, Johnson, and González de Guzmán (2006) includes 111 verbs with bimoraic lexical stems. For each the

³² The verb has an alternative pair *ki+xa* /3-3/ ‘do’ > IRR.STEM *ku+sa* in the *ku+* class.

authors give three inflected forms: the irrealis (called ‘future’), the completive (called ‘past’) and the incomplete (called ‘present’). Xochapa has four level tones. To facilitate comparison we have converted the orthography of the original, which uses accents, to that we employ for YM: 1 (low) to 4 (high), and two contour tones, one rising and one falling.

In XM, the completive may be encoded in either of two ways, the distribution of which is in complementary distribution. Verbs that have a tone /3/ on $\mu 1$ in their lexical representation (i.e., irrealis), receive a tone /2/ in the completive, as in (30a). Verbs with a lexical tone /1/ on $\mu 1$ (mostly, but not exclusively, associated with intransitive verbs as in YM; see examples below), receive the prefix *ndi*¹-, cognate of YM *ni*¹- used in the CPL-1 (30b). Among the bimoraic examples in (30), there are also instances of variant verbs of the two classes *ku*+ and *ka*+, again cognate with YM.

(30)	IRR	CPL		
a.	cha ³ bi ³	cha ² bi ²	(tr)	‘pay’
	ka ³ a ³	ka ² a ²	(intr)	‘bathe (at sweat lodge)’
	ku ³ un ³	ku ² un ²	(intr)	‘produce’
	ku+ ³ tu ⁴	chu+ ² tu ⁴	(intr)	‘get filled’
	ka+ ³ kin ³	xa+ ² kin ²	(tr)	‘place’
	ka+ ³ mi ³	xa+ ² mi ²	(tr)	‘burn’
b.	ka ¹ nda ¹	ndi ¹ -ka ¹ nda ¹	(intr)	‘move, tremble’
	ku ¹ ni ¹	ndi ¹ -ku ¹ ni ¹	(tr)	‘want’
	ka ¹ an ¹	ndi ¹ -ka ¹ an ¹	(intr)	‘talk’
	nda ¹ i ¹	ndi ¹ -nda ¹ i ¹	(intr)	‘shout’, ‘bark’, ‘scold’

In contrast to XM, in which the two markings available for the completive appear in complementary distribution, in YM there are two alternative completive forms: CPL-1 and CPL-2. As we have pointed out above, for invariant verbs the form of CPL-2 with lexical tones /1/ or /14/ on $\mu 1$ is homophonous with that of the irrealis. A topic for future research, therefore, is whether in YM simple tonal marking of the completive is more common when a contrast with the irrealis is maintained. This contrast would be maintained when (1) the stem-initial tone of the irrealis is /3/, or (2) there is a segmental distinction between the lexical (completive) and irrealis stem (see §4.3.3).

The XM sample also includes 13 verbs with the prefixes *ku*³- for the irrealis and *xi*¹- for the completive. Some illustrative examples are given in (31). These verbs form their own inflectional class whose membership appears to be lexically determined.

(31)	IRR	CPL	INCPL	
	ku ³ -nda ³ a ³	xi ¹ -nda ² a ²	nda ⁴ a ³	(tr) ‘look after’
	ku ³ -na ³ ni ⁴	xi ¹ -na ² ni ⁴	na ⁴ ni ⁴	(intr) ‘be called’
	ku ³ -nda ³ tu ³	xi ¹ -nda ² tu ²	nda ⁴ tu ⁴	(tr) ‘wait’
	ku ³ -ndi ³ chi ³	xi ¹ -ndi ² chi ²	ndi ⁴ chi ³	(intr) ‘stand’ (SG sub.)

For the verbs in (31), notice that when the lexical stem has tone /3/ in the initial mora, the completive has /2/ (e.g. ‘look after’ (IRR) *ku*³-*nda*³*a*³ vs. (CPL) of *xi*¹-*nda*²*a*²). This may result from tone sandhi rules, pointing to a harmonization of tone /3/ to the low tone of the prefix *xi*¹-, but could also be taken as the bridging context from which the possible reanalysis of tone /2/ as a marker of completive in XM resulted in the forms given in (30a). Similarly, the stem formative *ku*+ that we find in the irrealis of verbs of the *ku*+ class is undoubtedly the historical reflex of the stem formative of that class. As we have pointed out, the irrealis stem

of many verbs was historically levelled to the entire paradigm, producing a large number of invariant verbs that now have a stem with a velar onset /ku/ in all forms.³³

For the incomplete, when the tonal melody of the base is /1-1/ as in (32a), inflectional tone /4/ overwrites lexical tone /1/ on μ_1 , just as it does with initial lexical tone /3/, as shown in (32b-c). However, when the melody of the base is /1-3/ or /1-4/, as in (32d-e), the inflectional tone of the incomplete is added onto, but does not replace, the lexical tone /1/ of μ_1 , resulting into a falling tone on μ_1 that given the lack of pitch specification in the source we write simply as falling (v^F) though most likely the contours are /41-3/ and /41-4/.

(32)		IRREAL	INCP	CPL	Transitivity	Gloss
a.	/1-1/	ka ¹ nda ¹	ka ⁴ nda ¹	ndi ¹ -ka ¹ nda ¹	(intr)	'move, tremble'
		ku ¹ ni ¹	ku ⁴ ni ¹	ndi ¹ -ku ¹ ni ¹	(tr)	'want'
		ka [?] an ¹	ka [?] an ¹	ndi ¹ -ka [?] an ¹	(intr)	'talk'
		nda [?] i ¹	nda [?] i ¹	ndi ¹ -nda [?] i ¹	(intr)	'shout, bark, scold'
b.	/3-3/	ka ³ ku ³	ka ⁴ ku ⁴	ka ² ku ²	(intr)	'be born'
		ka ³ chi ³	ka ⁴ chi ³	ka ² chi ²	(tr)	'say'
		chi ³ i ³	chi ⁴ i ⁴	chi ² i ²	(intr)	'get wet'
		nda [?] a ³	nda [?] a ³	nda [?] a ²	(intr)	'get better, recuperate'
c.	/1-3/	ka ¹ ku ³	ka ^{F(41)} ku ³	ndi ¹ -ka ¹ ku ³	(intr)	'escape'
		ndi ¹ ko ³	ndi ^{F(41)} ko ³	ndi ¹ -ndi ¹ ko ³	(intr)	'cool down'
		ndo ¹ o ³	ndo ^{F(41)} o ³	ndi ¹ -ndo ¹ o ³	(intr)	'stay'
		ka [?] un ³	ka [?] un ³	ndi ¹ -ka [?] un ³	(intr)	'burn'
d.	/1-4/	chi ¹ yo ⁴	chi ^{F(41)} yo ⁴	ndi ¹ -chi ¹ yo ⁴	(intr)	'boil'
		nu ¹ na ⁴	nu ^{F(41)} na ⁴	ndi ¹ -nu ¹ na ⁴	(intr)	'open'
		sa ¹ a ⁴	sa ^{F(41)} a ⁴	ndi ¹ -sa ¹ a ⁴	(intr)	'get warm'
e.	/3-4/	ko ³ ko ⁴	ko ⁴ ko ⁴	ko ² ko ⁴	(tr)	'swallow, gulp down'
		sa ³ ta ⁴	sa ⁴ ta ⁴	sa ² ta ⁴	(tr)	'buy'
		ta ³ an ⁴	ta ⁴ an ⁴	ta ² an ⁴	(tr)	'put in, insert' (PL OBJ)

A summary comparison of the realization of the incomplete in Yoloxóchtli Mixtec and Xochapa Mixtec is given in table 11 with data of 106 verbs in XM.³⁴ The number of occurrences of each tonal melody pattern is given in the final column.

³³ In Cuicatec, the historical reflex of an irrealis prefix *ku*³- can still be observed (see Feist and Palancar, this volume).

³⁴ Not included in the table of 106 verbs are five somewhat irregular verbs that are not easily categorized. Three add *ku*³- to an incomplete form with a tonal melody of /4-4/; one adds *ku*³- to an incomplete form with a tonal melody of /3-4/. The final irregular verb is 'go'.

Table 11. Comparative of the realization of the incomplete in bimoraic verbs of YM and XM

		YM	XM	Occurrences
/1-1/	disyllabic	$CV^1CV^1 > CV^4CV^1$	$CV^1CV^1 > CV^4CV^1$	11
	monosyllabic	$CV^1V^1 > CV^4V^1$	$CV^1V^1 > CV^4V^1$	4
/3-3/	disyllabic	$CV^3CV^3 > CV^4CV^3$	$CV^3CV^3 > CV^4CV^3$	11
			$CV^3CV^3 > CV^4CV^4$	25
	monosyllabic	$CV^3V^3 > CV^4V^4$	$CV^3V^3 > CV^4V^3$	3
			$CV^3V^3 > CV^4V^4$	15
/1-3/	disyllabic	$CV^1CV^3 > CV^4CV^{13}$	$CV^1CV^3 > CV^F CV^3$	7
	monosyllabic	$CV^1V^3 > CV^4V^{13}$	$CV^1V^3 > CV^F V^3$	6
/1-4/	disyllabic	$CV^1CV^4 > CV^4CV^{14}$	$CV^1CV^4 > CV^F CV^4$	2
	monosyllabic	$CV^1V^4 > CV^4V^{14}$	$CV^1V^4 > CV^F V^4$	1
/3-4/	disyllabic	$CV^3CV^4 > CV^4CV^4$	$CV^3CV^4 > CV^4CV^4$	20
	monosyllabic	$CV^3V^4 > CV^4V^{24}$	$CV^3V^4 > CV^4V^4$	1

For the incomplete form of verbs with lexical melody /1-1/, both YM and XM keep the lexical tone on μ_2 , but with /3-3/ YM shows a split pattern based on syllable structure (i.e., predictable from the morphophonology of the stem), whereas XM has a lexical split (i.e., with no apparent motivation). For verbs with melodies /1-3/ and /1-4/, XM adds the high tone of the incomplete to the lexical low tone on μ_1 , resulting in a falling tone, but maintains the lexical tone of μ_2 . In YM, in contrast, the high tone /4/ of the incomplete replaces the lexical tone /1/ on μ_1 which is aligned then to μ_2 , resulting in a rising tone on μ_2 . Finally, for verbs with melody /3-4/, XM preserves lexical tone on μ_2 in all cases, whereas syllabic structure is again very relevant for YM where we find a split between /4-4/ and /4-24/.

The tonal inflection of both XM and YM is in general very similar. We take this systemic similarity to point to a common feature of the Guerrero subgroup. But a glimpse into the inflection of San Juan Colorado Mixtec, another Mixtec language for which a published dictionary provides ample comparative data on verb morphology, suggests that Mixtec languages may also show tonal allomorphy not predictable by morphophonology.

San Juan Colorado Mixtec (henceforth SJCM) is spoken in the district of Jamiltepec, state of Oaxaca, by approximately 6,000 people. SJCM pertains to the Coasta branch of Mixtec (see fig. 1), and it is thus only distantly related to the Southern Baja branch containing the Guerrero subgroup. To provide comparative data, we rely on a sample of 179 verbs from the dictionary by Stark et al. (1986) that has the following two properties: (a) the verbs have bimoraic stems in all three forms; and (b) the irrealis and the completive have the same tonal melody although the irrealis is formed by preceding the irrealis stem with the modal marker *kwa*³⁵. This means that the incomplete form is the only form marked by tone, and it is precisely in the tonal patterns found in incomplete that the inflection of SJCM differs from both YM and XM.

Based exclusively on the data available in Stark et al. (1986), the incomplete form in SJCM displays a tonal allomorphy whose conditioning appears to be lexical. This means that the morphology of the incomplete is best analyzed by grouping SJCM verbs according to the tonal melodies manifested in the incomplete. Such an organization results in the four inflectional classes described in table 12.

³⁵ The appearance of this mood marker is undoubtedly the cognate of the negative irrealis marker *kwa*¹⁴ used with YM verbs whose irrealis form has /14/ on μ_1 . This point was discussed in section 4.2.3.

Table 12. Tonal classes for the incomplete in SJCM.

CLASS	LEX	IRR	CPL	INCPL
I	17	/1-1/	kwa ¹ ka ¹ an ¹	ka ¹ an ¹ /3-3/ ka ³ an ³ (tr) ‘bite’
	31	/1-2/	kwa ¹ ka ² y ¹ i ²	ka ² y ¹ i ² ka ³ y ¹ i ³ (tr) ‘paint’
	1	/3-2/	kwa ¹ ko ¹ kon ²	ko ¹ kon ² ko ³ kon ³ (tr) ‘swallow’
	96	47	/2-2/	kwa ¹ nu ² ña ²
II	5	/1-1/	kwa ¹ ndi ¹ y ¹ i ¹	ndi ¹ y ¹ i ¹ /3-2/ ndi ³ y ¹ i ² (intr) ‘scorch’
	4	/1-2/	kwa ¹ tsi ¹ yo ²	tsi ¹ yo ² tsi ³ yo ² (intr) ‘have diarrhoea’
	29	20	/2-2/	kwa ¹ ki ² ku ²
III	4	/1-1/	kwa ¹ nda ¹ tsi ¹	nda ¹ tsi ¹ /3-1/ nda ³ tsi ¹ (intr) ‘become loose’
	1	/1-2/	kwa ¹ na ¹ ñi ²	na ¹ ñi ² na ³ ñi ¹ (tr) ‘hit’
	6	1	/2-1/	kwa ¹ ka ² y ¹ i ¹
IV	20	/1-1/	kwa ¹ ka ² an ¹	ka ² an ¹ /2-3/ ka ² an ³ (tr) ‘talk’
	3	/1-2/	kwa ¹ ja ¹ ta ²	ja ¹ ta ² ja ² ta ³ (tr) ‘buy’
	21	/2-1/	kwa ¹ nda ² ba ¹	nda ² ba ¹ ndaa ² ba ³ (tr) ‘switch off’
	48	4	/2-2/	kwa ¹ na ² ma ²

Verbs in classes I to III have a high tone /3/ on μ_1 of the incomplete. Again, this marking strategy is reminiscent of the use of a high tone /4/ in both YM and XM for the same function. What is different about SJCM is that there are many verbs (class IV, approximately 27 percent of the total number of verbs analyzed) that mark the incomplete with a mid tone /2/. Additionally, taking simply the surface forms of verbs in isolation, there is no apparent motivation for the tonal changes manifested on the second mora of the verbs analyzed. Even if the default rule were to raise the lexical tone to tone /3/ in all morae, the patterns manifested in classes II and III would still require an explanation.

Tonal allomorphy involving the marking of the incomplete is also found in YM, as we saw in table 6 above, but in YM the outcome of tonal variance (except for the verb noted in fn. 23) is predictable from a combination of tonal melody and syllabic structure. Nevertheless, from an Oto-Manguan perspective, the tonal classes of SCJM are not typologically odd. Similar lexically conditioned patterns are also found in many languages of this stock including Cuicatec (Feist and Palancar, this volume), Triqui (DiCanio, this volume), Mazatec (Léonard and Fulcrand, this volume), Amuzgo (Kim, this volume) and Chatino (Campbell, this volume). It remains possible that a more refined phonological analysis carried out on SJCM verbs with novel data might reveal tonal structures or the influence of floating tones that have escaped our understanding. This paper is a cordial invitation to carry out such research in this fascinating area of the grammar of Mixtec. Documenting these languages by way of well-informed lexical databases is a priority before it is too late.

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TO BE COMPLETED AT A LATER STAGE

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