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Tone and Inflection

New Facts and New Perspectives

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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: incompletive (also called 'habitual', 'continuative', or even 'present') and completive (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 incompletive, though tone alone may also mark the completive. Some Mixtec languages use tone productively to mark negation, as in Metlatonoc (Overholt, 1961:620) and Xochapa (Stark et al., 2006:120). As for derivation, though no longer a productive process, tone may also be manifested in transitivity alternations as in Xochapa (Stark et al., 2006:118) and San Juan Colorado (Stark et al., 1986:168).[1] Similarly, tone is also involved in denominal adjective derivation in Chalcatongo Mixtec in what has been called the 'adjectival high' by Hinton et al. (1991) and which Macaulay (Stark et al., 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 completive, 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 denominal adjectives but also attributive nouns and stative or resultative verbs as well as the incompletive.[3]

Despite what we consider 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

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1 Note that for Yosondúa Mixtec a segmental morpheme (*x-* or *s-*) marks the transitive of intransitive/transitive pairs (Beaty 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 incompletive aspect as well as to form stative forms (see McKendry 2013:32–34, and Macaulay 1996:65 and *passim*.).

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.

Map 1: Location of Yoloxóchitl Mixtec in Mexico

Yoloxóchitl Mixtec (henceforth YM) is charactized 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., a stem-final tone affects the tone of a following 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

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4 One of the rare examples of possible sandhi is the sequence $ku\partial^1un^1$ ('go' [IRR]) + verb with initial tone /3/, which shows a lowering of the initial tone of the verb: $ku\partial^1\tilde{u}^1 + ku^3chi^3$ ('bathe') → $ku\partial\tilde{u}^1 ku^1chi^3$ ('go to bathe'). Interestingly, the Mixtec of Cuanacaxtitlan, a closely related neighboring village about 5 km southeast of Yoloxóchitl, manifests sandhi in some cases. For example, Christian DiCanio observed that at least in some cases word-final high tones (/4/) spread to low (/1/) initial tones on following words. Thus ku^1mi^4 ('four') followed by ka^1ta^1 ('sugar press [trapiche]') is realized as $ku^1mi^4 ka^1ta^1$ in Yoloxóchitl but $ku^1mi^4 ka^4ta^1$ in Cuanacaxtitlan. The extent of this tone spreading (i.e., whether all word-final high tones spread to a low initial tone on a following word or whether this phenomenon may be lexically determined) still needs to be investigated.

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 =*yu¹*, used to mark first person 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, *yu¹u⁴* 'stone' > *yu⁴u⁴* 'solid', *xaʔ³an²* 'fat' > *xaʔ¹⁴an²* 'greasy', and *ñuʔ³u⁴* 'earth' > *ñuʔ⁴u⁴* '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: *tio¹ko⁴* 'ant' > *tio¹⁴ko³* in the compound *i³ta²* ('flower') + *tio¹⁴ko³* '*Montanoa grandifolia* DC', a plant of the Asteraceae family known for its pungent 'ant-like' smell, and *tio⁴ko⁴* in the compound *ña¹ña⁴* + *tio⁴ko⁴* ('ant eater'); *tiʔ¹ĩ⁴* 'skunk' > *tiʔ⁴ĩ⁴* in the compound *yu³ba²* ('edible green') + *tiʔ⁴ĩ⁴* '*Solanum nigrescens* M. Martens & Galeotti', an edible plant of the Solanaceae family; *yu³ku⁴* 'hill' > *yu¹ku⁴* in the compound *ki³ni²* ('pig') + *yu¹ku⁴* 'wild boar'; and finally *i³su²* 'deer' > *i⁴su⁴* in the compound *ko¹o⁴* ('snake') + *i⁴su⁴* 'boa' ('deer snake' is a common Mesoamerican calque).[5]

– Irregular adjectival/nominal marking: *laʔ⁴la¹* 'worn-out (bags, hammocks)' > *laʔ¹⁴la¹* 'worn-out clothes'.

– Marking of scale: *bi¹xĩ³* 'cold' ~ *bi¹xĩ¹* 'lukewarm'.

– Marking of the characterization of time periods: *sa¹bi⁴* 'rain' > *sa⁴bi⁴* 'rainy season'.

– Different modification functions: *ti¹ka¹yu¹* 'jet' as a modifier used only with *nda⁴a⁴* 'black'' to indicate 'jet black' and in *ti⁴ka¹yu¹* '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. Section 2 presents a brief overview of YM. The following section begins with a summary presentation of YM segmental and autosegmental phonology. It continues with a discussion of the role of tone in YM inflectional and derivational morphology and patterns of tonal allophony that are dependent on

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5 For calques, see Campbell et al. (1986) and Smith-Stark (1982, 1994)

phonological and morphosyntactic factors. Section 4 presents patterns of tonal variation related to verbal inflection in the irrealis, incompletive, completive and negative irrealis. We examine both tonal marking and segmental alternations. This study ends, section 5, by comparing YM verbal inflection to that found in closely related Xochapan Mixtec (state of Guerrero) and that of the more distantly related San Juan Colorado Mixtec (state of Oaxaca). As a result of this comparison we suggest the possibility of a regional pattern of verbal inflection through tone 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 & 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.

Both YM and Xochapan Mixtec (which, along with San Juan Colorado Mixec, 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.
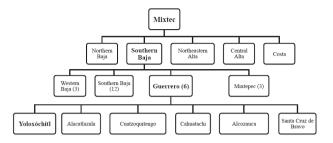
Figure 1: Mixtec family based on Josserand (1983), from DiCanio et al. (2014)

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 significant 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 segmental and 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: $xa\textipa{P}^1a^4$ 'foot' + $ku\textipa{P}^1u^1$ 'area (be it urban or distant from a village) overgrown with weeds' becomes $xa^{14}ku\textipa{P}^1u^1$ '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 CVʔV stems with both features: $iʔ^3in^3$ '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. 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. 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]

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

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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^3en^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: $piʔ^1la^4xi^{132}$ '*Jaltomata darycana*' and $ku^4tu^1pi^{342}$ '*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 $kiaʔ^3bi^{13}$ 'be sold', while /3–14/ occurs only in the quantifier i^3nda^{14} 'one'.

were 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^{T}ma^T/ alone manifests 21 tonal contrasts. These are different from 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/	i?^{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/	ti?^{13}bi^2	'lightning bug'
/3-3/	ta?^{3}ni^3	'animal breast'		/14-1/	na?^{14}a^1	'demoniac'
/3-4/	bi^{3}ko^4	'feast'		/14-2/	ma^{14}ñu^2	'central place'
/3-42/	ñu^{3}u^{42}	'night'		/14-3/	nu^{14}u^3	'face'
/4-1/	ya?^{4}a^1	'darkish, brown'		/14-4/	ye?^{14}e^4	'door'
/4-2/	xa?^{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 (/1/, /3/, /4/, /13/, /14/), the second mora, which is lengthened, allows for nine (/1/, /2/, /3/, /4/, /13/, /14/, /24/, /32/, /42/) 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 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 & 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, 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

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[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 incompletive, the incompletive 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 *nda³-* when the semantics of the iterative are not transparent.

lexeme.[11] There are 282 bimoraic verbs in our sample. Some examples appear in (3), inflected in the irrealis.

(3)   a. ka^{3}a^4 (intr)   'slip'
         tu^{3}tu^4 (intr)   'whistle'
         ka^{3}xi^4 (tr)   'eat' 'bite' or 'bite into' (foods such as fruit, popcorn,
                                       pozole and sometimes meat, chicken or cheese)[12]
         sa^{3}ta^4 (tr)   'buy'
    b. ke^{1}yu^4 (intr)   'swim'
    c. chi^{3}kun^2 (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. ka^{1}ku^3 /1-3/ (intr) 'escape'   ~ ka^{3}ku^3 /3-3/ (intr) 'be born'
         ke^{1}ta^3 /1-3/ (intr) 'get in'   ~ ke^{3}ta^3 /3-3/ (intr) 'get out'
                                  (sɢ sub.)   (sɢ sub.)
         ki^{1}ni^4 /1-4/ (intr) 'be balanced' ~ ki^{3}ni^4 /3-4/ (tr)   'shoot'
    b. ka^{3}ba^3 /3-3/ (intr) 'lie down'   ~ ka^{3}ba^4 /3-4/ (tr)   'turn around'
         ka^{3}si^2 /3-2/ (tr)   'take a   ~ ka^{3}si^4 /3-4/ (intr) 'get goose
                                shortcut'   bumps'
         ka^{1}an^1 /1-1/ (intr) 'get drilled' ~ ka^{1}an^3 /1-3/ (intr) 'get used'
    c. ka?^{1}a^1 /1-1/ (intr) 'drown'   ~ ka?^{3}a^3 /3-3/ (intr) 'emit a
                                                      sound'

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11 Our sample includes bimoraic and trimoraic verbs, but excludes several quadrimoraic verbs present in the dictionary (e.g. *ta^{3}xi^{3}kwa?^{4}a^4* 'keep', *ka^{3}sa^{3}chiu^{4}un^4* 'work', among others). Such quadrimoraic verbs, nevertheless, follow the same principles as bimoraic and trimoraic verbs.
12 *Ka^{3}xi^4* contrasts with *ku^{3}xi^3*, the latter used for eating meals such as mole, tortillas and most other "meal-type" foods. The eating of meat can be expressed by either verb in patterns, if any, that are not yet fully understood.

ka^{1}sun^1 /1-1/ (intr) 'creak'   ~ ka^{3}sun^2 /3-2/ (intr) 'get fried'

ti^{3}bi^2 /3-2/ (intr) 'blow out   ~ ti^{14}bi^3 /14-3/ (intr) 'rot'
                              air' or 'play
                              a wind
                              instrument'

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

(5) a. kwi^{1}i^4 /1-4/   (intr)   'fight'
        kwi^{3}i^4 /3-4/   (tr)   'peel'
        kwi^{3}i^3 /3-3/   (intr)   'be able'
     b. kwi^{1}so^1 /1-1/   (intr)   'boil'
        kwi^{1}so^3 /1-3/   (intr)   'be pricked'
        kwi^{3}so^3 /3-3/   (tr)   'load'
     c. ta^{1}ni^1 /1-1/   (intr)   'be spoilt'
        ta^{14}ni^3 /14-3/   (intr)   'bruise'
        ta^{3}ni^3 /3-3/   (intr)   'be carried away by water'
     d. tu^{3}u^3 /3-3/   (tr)   'sting'
        tu^{1}u^3 /1-3/   (intr)   'appear'
        tu^{3}u^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. The tonal pattern /3–13/, however, is found only in one verb, *kiaʔ^{3}bi^{13}* ('be sold'), but in no other bimoraic lexical stem. In bimoraic words, /14–1/ is found in one verb, *chuʔ^{14}ma^1* 'be censed (with incense)', two nouns and one adjective; two nouns and one adjective; /14–4/ is quite common although found in only one verb, *xioʔ^{14}o^4* ('become ill after having craved a food').

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

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

not attested anywhere in the lexicon. As noted above, there are no bimoraic verbs in the irrealis with a lexical high tone /4/ on the first mora (μ1)[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 μ1. There is a greater range of tone values for the second mora (μ2), although 45 percent of the total number of verbs (126 of 282) have tone /3/ on μ2. 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.

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

		μ2						
		/1/	/2/	/3/	/4/	/13/	/32/	
μ1	/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

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.

Table 2: Lexical tonal melody and transitivity in bimoraic verbs

			μ2								
			/1/	/2/	/3/	/4/	/13/	/14/	/32/	intr	tr
μ1	/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

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

We see from Table 2 that almost 90 percent (96 out of 110) of bimoraic verbs with tone /1/ on µ1 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 µ1 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 µ1 and the transitive verb tone /3/. In patterns (6a) and (6b), the tone on µ2 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. In (6d) the upward shift to tone /4/ on the final mora is irregular and unexplained. 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]

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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. ni¹-ku¹ni⁴   ya?3a4 [i13xa3   Juan]
         CPL-be.ground   chilli   CPL.do   John
         'The chilli (old information) was ground by John.'
     b. ni¹-ko?¹ni⁴   ji¹ndi¹ki⁴ [i¹³xa³   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: *ke¹ta³* 'enter' (SG subj.) and *ke³ta³* 'exit' (SG subj.) and, despite the segmental difference, *nde¹e³* 'enter' (PL subj.) and *ke³e³* 'exit' (PL subj.).

(6) a. ku¹un⁴ /1-4/ (intr) 'be ground'   ~ ku³un⁴ /3-4/ (tr) 'grind chilli for sauce'

  ko?¹ni⁴ /1-4/ (intr) 'be milked'   ~ ko?³ni⁴ /3-4/ (tr) 'milk'

  kwi¹i⁴ /1-4/ (intr) 'peel off'   ~ kwi³i⁴ /3-4/ (tr) 'peel'

  nda¹ta⁴ /1-4/ (intr) 'get split in two' ~ nda³ta⁴ /3-4/ (tr) 'split in two'

  ta?¹bi⁴ /1-4/ (intr) 'get broken'   ~ ta?³bi⁴ /3-4/ (tr) 'break'

  ta¹xi⁴   /1-4/ (intr) 'be fired from work' ~ ta³xi⁴   /3-4/ (tr) 'fire from work'

  tu¹xi⁴   /1-4/ (intr) 'be crushed'   ~ tu³xi⁴   /3-4/ (tr) 'crush'

  b. na¹ma³ /1-3/ (intr) 'get changed'   ~ na³ma³ /3-3/ (tr) 'change'

  c. ka¹an¹ /1-1/ (intr) 'get drilled'   ~ ka³an² /3-2/ (tr) 'drill'

  tu¹un¹ /1-1/ (intr) 'get turned on'[17] ~ tu³un² /3-2/ (tr) 'turn on'

  d. ka¹ba¹ /1-1/ (intr) 'turn around'   ~ ka³ba⁴ /3-4/ (tr) 'turn around'

  ka?¹yu¹ /1-1/ (intr) 'be written'   ~ ka?³yu⁴ /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.

As with bimoraic verbs, trimoraic verbs may also have tones /1/, /3/ or /14/ on μ1, 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 *ni¹-* being an inflectional morpheme). Thus the tonal pattern on μ1 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 μ2 and μ3. 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.

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17 Said of an electric device.

Table 3: Tone melodies in trimoraic verbs

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

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

					μ3					
		/1/	/2/	/3/	/4/	/13/	/14/	/24/	/32/	/42/	Total
μ2	/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 μ2, as in (7a), or to μ3, as in (7b). Triplets of minimal pairs involve a combination of such possibilities (7c).

(7) a. ku^{3}nda^{1}a^4 /3-1-4/ (intr) 'grow hoarse' ~ ku^{3}nda^{4}a^4 /3-4-4/ (intr) 'darken'

  b. ko^{3}nde^{3}e^3 /3-3-3/ (intr) 'sit' (PL sub.) ~ ko^{3}nde^{3}e^4 /3-3-4/ (intr) 'endure'

   ka^{3}ti^{1}in^1 /3-1-1/ (intr) 'resound, ~ ka^{3}ti^{1}in^3 /3-1-3/ (intr) 'pile up'
          throb'

  c ku^{3}na?^{1}a^1 /3-1-1/ (intr) 'be free, not
            be busy'

   ku^{3}na?^{3}a^2 /3-3-2/ (intr) 'get founded'

   ku^{3}na?^{3}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 μ1 as in (8a), it is more common that the tonal contrast is realized on μ2 (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 μ2 (and occasionally on μ3 as well: *nda^3+sa^{1}ka^1* vs. *nda^3+sa^{3}ka^4*). Thus in trimoraic verbs, the intransitive alternation is marked on μ1 of the bimoraic stems to which the iterative is prefixed.

(8) a. ki^1+tu?^{4}un^4 /1-4-4/ (intr) 'be pulled ~ ki^3+tu?^{4}un^4 /3-4-4/ (tr) 'pull off'
                   off'

  b. nda^3+ka^{1}ya^1 /3-1-1/ (intr) 'be gathered ~ nda^3+ka^{3}ya^2 /3-3-2/ (tr) 'gather
                    up'   up'

   nda^3+sa^{1}ka^1 /3-1-1/ (intr) 'get mixed ~ nda^3+sa^{3}ka^4 /3-3-4/ (tr) 'mix up'
                    up'

   nda^3+tu^{1}u^4 /3-1-4/ (intr) 'get   ~ nda^3+tu^{3}u^4 /3-3-4/ (tr) 'wrap
                    wrapped   up'
                    up'

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 open' ~ $ndu^3+ku^3na^4$ /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. ka³ba³   /3-2/ (intr) 'lie down' ~ cha³+ka³ba³ /3-3-2/ (tr) 'lay down'
        kwi³in³ /3-3/ (intr) 'be hung'   ~ cha³+kwi³in³ /3-3-3/ (tr) 'hang up'
                              or 'hanging   (PL sub.)
                              up' (PL
                              sub.)

    b. kwaʔ³a³ /3-3/ (intr) 'be made'   ~ xi³+kwaʔ²ᵃ⁴a⁴ /3-4-4/ (tr) 'be made'
                                                                     or 'be
                                                                     built'

Stem formatives such as *ndu³+*, *cha³+* or *xi³+* are not productive and are restricted to a small number of lexical forms. In some cases the historical derivation is apparent: *chi³+ kuʔ³ba²* 'measure' (tr) is undoubtedly related to *kuʔ³ba²* '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 the nouns *ku¹nduʔ¹u⁴* 'bush' and *ti¹nduʔ²ᵃ⁴u⁴* 'lit firewood' seem to suggest a stem,*nduʔ¹u⁴* or *nduʔ²ᵃ⁴u⁴*, 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: *ku³+bi¹xi³²* 'get white hair' from *bi¹xi³²* 'white hair' and the inchoative marker *ku³-*.

   In contrast to the causative-like semantics of some stem formatives, such as those just discussed, YM has a genuine productive causative prefix, *sa⁴-*, 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, *kwaʔ³a³*, is used only in a ritual context with a meaning to the effect of 'be benefited 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. kaʔ¹a¹   (intr) 'drown'   >sa⁴-kaʔ¹a¹   (tr) 'drown [sb.]'
        kaʔ¹an¹   (intr) 'talk'   >sa⁴-kaʔ¹an¹   (tr) 'make talk'
        kiʔ¹bi³   (intr) 'get in'   >sa⁴-ka¹ku³   (tr) 'force in'
        na³ñu³   (intr) 'get fat'   >sa⁴-na³ñu³   (tr) 'fatten'
        chi³chin⁴   (intr) 'suckle'   >sa⁴-chi³chin⁴   (tr) 'breast feed'
    b. nda³+i³chi²   (intr) 'dry up'   >sa⁴-nda³i³chi²   (tr) 'dry'
        nda³+ka³a⁴   (intr) 'trip'   >sa⁴-nda³-ka³a⁴   (tr) 'trip [sb.] up'
        nda³+kaʔ³an⁴   (intr) 'remember'   >sa⁴-nda³-kaʔ³an⁴   (tr) 'remind'
        tu¹+xuʔ²ᵃu²   (intr) 'get hurt'   >sa⁴-tu¹xuʔ²ᵃu²   (tr) 'harm'
        ku¹+ndaʔ¹a³   (intr) 'move up'   >sa⁴-ku¹ndaʔ¹a³   (tr) 'remove'
    c.   sa⁴+kwaʔ³a³   (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) $cha^3+ka^3+ndu?^4u^4$ (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 optionally occur instead of $=yu^1$ 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'.[18] 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 $ndoʔ^4o^4$ 'suffer' > $ndoʔ^4o^{(4)}{=}^2$ > $ndoʔ^4o^2$ '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/).[19] 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 CVʔV but maintained in disyllabic roots (e.g., $nda^4ta^4{=}^2$ 'I split (something) in two').[20]

4.2 Tone and the marking of aspect/mood

Verbs in YM inflect for incompletive and completive 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 completive, 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.

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.

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18 Note that in neighboring Cuanacaxtitlan the use of tone, =2, as a first person enclitic does not occur as an allomorph of =yu^1 adding further evidence that Yoloxóchitl /2/ is inovative.

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

20 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	ta^{3}bi^4	kwi^{1}so^1
NEG.IRR	chi^{14}kun^2	ku^{14}+ñu^{3}u^3	ta^{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-ta^{3}bi^4	ni^1-si^{1}so^1
CPL-2	chi^{13}kun^2	ju^{13}+ñu^{3}u^3	ta^{13}bi^4	si^{1}so^1
INCPL	chi^{4}kun^2	ju^4+ñu^{3}u^3	ta^{4}bi^4	si^{4}so^1
STAT	ndi^{4}kun^2	---	ta^{4}bi^4	---
PROG	chi^4+ndi^{3}kun^2	ñu^{4}u^4	---	---

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.[21] While the form for the 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 μ1 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 μ1, (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 (15a) and (15b).

(15) CPL-1   CPL-2
    a. ni^1-chi^{3}chin^4 chi^{13}chin^4 (intr)   'suckle'
       ni^1-ka^{3}an^4 ka^{13}an^4 (tr)   'believe'
    b. ni^1-chi^3+nda^{3}a^4 chi^{13}+nda^{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/ (16).

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21 This could be taken as a canonical instance of overabundance (Thornton 2011).

(16) CPL-1   CPL-2   NEG.IRR

    ni^1-sa^4-na$?^1$a^1 sa^{14}-na$?^1$a^1 sa^{14}-na$?^1$a^1 (tr)   'teach'

    ni-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 µ1. As a result, the tonal melodies of the CPL-2 and the irrealis of verbs with /1/ or /14/ on µ1 are homophonous (17). Nevertheless, a significant number of verbs have irrealis forms whose segments are distinct from those of the lexical stem (the stem of the CPL-2) (see §4.3). In cases of lexical tones /1/ or /14/ on µ1, 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.

(17) 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$?^4$u^2 tu^1+xu$?^{14}$u^2 tu^1+xu$?^4$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 incompletive

In the default situation, the form for the incompletive aspect is built by overwriting the lexical tone on µ1 with high tone /4/. In (18) instances of CPL-1 are given alongside the incompletive to provide a reference for lexical tone of the stem.

(18)   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$?^4$u^2 tu^4+xu$?^4$u^2 (tr)   'get hurt'

As causatives already have a tone /4/ on μ1, which is lexically associated with the prefix *sa⁴-*, the incompletive is indistinguishable in surface form from the irrealis (19).

(19) IRR INCPL
    sa⁴-ndo³to³   sa⁴-ndo³to³   (tr)   'wake up'
    sa⁴-ndu¹xin¹   sa⁴-ndu¹xin¹   (tr)   'bury'

With level tones in a bimoraic stem, the formation of the incompletive 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 incompletive

Syllable structure		LEX	INCPL	CPL-1	INCPL	
a	disyllabic	/1-1/ > /4-1/		ni¹-ki¹xin¹	ki⁴xin¹	'fall asleep'
	monosyllabic			ni¹-tu¹un¹	tu⁴un¹	'catch fire, light up'
b	disyllabic	/1-3/ > /4-13/		ni¹-ka¹ku³	ka⁴ku¹³	'escape'
	monosyllabic			ni¹-ka¹an³	ka⁴an¹³	'get accustomed'
c	disyllabic	/1-4/ > /4-14/		ni¹-ka¹xan⁴	ka⁴xan¹⁴	'sneeze'
	monosyllabic			ni¹-ku¹un⁴	ku⁴un¹⁴	'for chilli to be ground into sauce'
d.1	disyllabic	/3-3/ > /4-3/		ni¹-ka³ba³	ka⁴ba³	'lie down to sleep'
				ni¹-nda³ba³	nda⁴ba³	'fall'
d.2	monosyllabic	/3-3/ > /4-4/		ni¹-chi³i³	chi⁴i⁴	'get wet'
				ni¹-ka?³a³	ka?⁴a⁴	'emit a sound'
				ni¹-ku³u³	ku⁴u⁴	'occur, happen'
				ni¹-chi?³i³	chi?⁴i⁴	'harvest' (tr)
e.1	disyllabic	/3-4/ > /4-4/		ni¹-ku³chi⁴	ku⁴chi⁴	'feel sad'[22]
				ni¹-ka³ba⁴	ka⁴ba⁴	'turn' (tr.)
e.2	monosyllabic	/3-4/ > /4-24/		ni¹-ka³a⁴	ka⁴a²⁴	'slip'
				ni¹-ku³un⁴	ku⁴un²⁴	'grind [chilli] for sauce'

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22 In collocation with the noun *i³ni²* 'heart'.

The preceding examples reveal interesting, though regular, patterns. If the lexical tone has /1/ on μ1 then /4/ is assigned to μ1 and the lexical tone /1/ on μ1 is assigned to μ2. This can be seen most clearly in (b) and (c) whose outcomes result in a rising tone /13/ or /14/ on μ2. When the lexical tone of μ2 is also /1/, it remains unchanged in the incompletive (a).

If the lexical tone of μ1 is /3/ then a split pattern develops depending on the syllabic structure of the stem. With disyllabic stems, the incompletive is formed by simply assigning /4/ to μ1; there is no change in the lexical tone of μ2 (d.1/e.1). If the stem is monosyllabic (CVV or CVʔV), then for lexical melodies /3-3/ the incompletive 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 μ1 is simply raised to /4/. In monosyllables, however, the mid tone /3/ on μ1 is pushed to μ2 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 incompletive formation involves the few irrealis stems that have a lexical tone /14/ on μ1 (for a complete list, see Table 7 below). Such stems require the incompletive prefix *i⁴*- if the verb is bimoraic, as shown in (20a) and Table 7.[23] But with trimoraic verbs, tone /4/ overwrites the lexical tone, as shown in (20b). Like other inflectional tones, tone /4/ for the incompletive is the reflex of a segmental form, in this case the archaic incompletive prefix *i⁴*-, only observable nowadays in this restricted prosodic context of initial /14/ in verbal lexical stems.

(20) CPL-1   INCPL
  a. ni¹-ki¹⁴tu³   i⁴-ki¹⁴tu³   (intr) 'dawn'
     ni¹-ta¹⁴ni³   i⁴-ta¹⁴ni³   (intr) 'get bruised' (fruit)
     ni¹-ti¹⁴bi³   i⁴-ti¹⁴bi³   (intr) 'rotten'
     ni¹-chu¹⁴tu²   i⁴-chu¹⁴tu²   (tr)   'kiss'
  b. ni¹-xo¹⁴+kwi¹in¹   xo⁴+kwi¹in¹   (intr) 'turn around to look'
     ni¹-si¹⁴+kwe¹kun¹   si⁴+kwe¹kun¹ (tr) 'spread a disease to (someone)'

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23 One verb has a suppletive incompletive form that begins with /i/: LEX.STEM *jo³nde³e³* 'sit down' (PL subj.) > INCPL *i⁴nde⁴e⁴*. Three other bimoraic verbs have an initial /i/ in their lexical stems, none of which have an initial /14/ tone: LEX.STEM *i³ʔin³* 'scratch' (INCPL *i²⁴in³*); LEX.STEM *i¹chi¹* 'dry up (something alive, such as a plant)' (INCPL *i⁴chi¹*); LEX.STEM *i³xa³* 'do' (INCPL *i⁴xa³*).

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):[24]

> 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:

(21) **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 (22a). A very small number of irregular verbs (cf. 22b) have the unexpected historical incompletive marker i^4- despite lacking the initial /14/ lexical tonal melody that otherwise motivates the use of this prefix.

(22)   CPL-1   INCPL   Expected
    a. ni¹-ka?¹an¹   ka?⁴an²   *ka?⁴an¹   (intr)   'talk'
       ni¹-sa¹a⁴   sa⁴a²⁴   *sa⁴a¹⁴   (intr)   'get upset'[25]
    b. ni¹-jo³nde³e³   (i⁴-)nde⁴e⁴   *jo⁴nde³e³   (intr)   'sit down' (PL sub.)

4.2.3 Inflectional tone for the negative: Irrealis, incompletive, completive

Negation in YM can be marked inflectionally by means of tone on verbs in the irrealis, completive and, less commonly, the incompletive. In cases in which

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24 The same incompletive prefix is also found Juxtlahuaca Mixtec (Ramírez and Beatham, 2012:4), e.g. *í-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.

25 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. 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 to be 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.

negation cannot be marked by tone a negative adverb is used. With the incomple-
tive, at times both tonal and syntactic marking of negation can occur with the
same verb stem (Examples in (25) below).

(23)   IRR   NEG.IRR

    a. $cho\textipa{P}^3ma^4$ $cho^{\mathbf{14}}ma^4$ (tr)   'squash'

      $ka\textipa{P}^1an^1$ $ka\textipa{P}^{\mathbf{14}}an^1$ (intr)   'talk'

    b. $ka^3+xi^4ta^3$ $ka^{\mathbf{14}}+xi^4ta^3$ (tr)   'grind'

      $tu^1+xu\textipa{P}^4u^2$ $tu^{\mathbf{14}}+xu\textipa{P}^{14}u^2$ (intr)   'get hurt'

    c. $sa^4\text{-}na\textipa{P}^1a^1$ $sa^{\mathbf{14}}\text{-}na\textipa{P}^1a^1$ (tr)   'teach'

      $sa^4\text{-}ka^3sun^2$ $sa^{\mathbf{14}}\text{-}ka^3sun^2$ (tr)   'fry'

Negation of the irrealis and completive through tone is shown in (23) and (24).
For the irrealis, negation is realized by overwriting the lexical tone on μ1, be it /1/
or /3/, by an ascending tone /14/. This occurs regardless of whether the verb has
a bimoraic stem as in (23a) or a trimoraic one, as in (23b), or even if the verb is a
causative derived verb with the prefix $sa^4\text{-}$, as in (23c).

    Note that despite the fact that in causative constructions with $sa^4\text{-}$ the irre-
alis and incompletive are formally indistinct, negation through a rising tone is
limited to the irrealis (24) whereas the negative of the incompletive is marked by
the adverb ba^{143}.

(24) IRR   NEG.IRR   INCPL   NEG.INCPL

    $sa^4\text{-}chi^3i^3$ $sa^{14}\text{-}chi^3i^3$ $sa^4\text{-}chi^3i^3$ $ba^{143}\,sa^4\text{-}chi^3i^3$ (intr)   'make wet'

In the causative, then, the irrealis and incompletive utilize distinct strategies to
mark the negative: tonal inflection for the irrealis, a syntactic structure for the
incompletive. This distinction suggests that despite the exceptions and irregulari-
ties noted in Tables 7 and 8, the prototypical markers of negation are tonal for the
irrealis and segmental for the incompletive.

    Negation of completive aspect only occurs with CPL-1 form, in which the
completive aspect is marked by the prefix $ni^1\text{-}$. 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 $ni^{14}\text{-}$, 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} the tone of the completive prefix
$ni^1\text{-}$ is raised to $ni^4\text{-}$.

(25) CPL-1   NEG.CPL-1   NEG.CPL-1

           WITH TONAL   WITH SYNTACTIC MARKING

           MARKING   AND RAISED TONE ON NI^1-

ni^1-na $ʔ^1ma^1$	ni^{14}-na $ʔ^1ma^1$	ba^{143} ni^4-na $ʔ^1ma^1$	(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'

Table 7: The negative of irrealis stems with /14/ on μ1

IRR	NEG.IRR	Alternative IRR	INCPL	
$ki^{14}tu^3$ / $ni^1ki^4tu^3$	kwa^{14} $ki^{14}tu^3$	----	i^4-$nki^{14}tu^3$	'dawn'
$chuʔ^{14}ma^1$	kwa^{14} $chuʔ^{14}ma^1$	----	i^4-$chuʔ^1ma^1$	'be censed (with incense)'
$ta^{14}ni^3$	kwa^{14} $ta^{14}ni^3$	----	i^4-$ta^{14}ni^3$	'get bruised' (fruit)
$ti^{14}bi^3$	kwa^{14} $ti^{14}bi^3$	----	i^4-$ti^{14}bi^3$	'get broken' (a machine)
$xa^{14}bi^2$	kwa^{14} $xa^{14}bi^2$	----	i^4-$xa^{14}bi^2$	'get tired'
$xa^{14}ni^2$	kwa^{14} $xa^{14}ni^2$	----	i^4-$xa^{14}ni^2$	'dream'
$xa^{14}ta^2$	kwa^{14} $xa^{14}ta^2$	----	i^4-$xa^{14}ta^2$	'shave' (sb's head)
$xi^{14}nda^2$	kwa^{14} $xi^{14}nda^2$	----	i^4-$xi^{14}nda^2$	'carve'
$xiʔ^{14}ni^3$	kwa^{14} $xiʔ^{14}ni^3$	----	i^4-$xiʔ^{14}ni^3$	'rub'
$xiʔ^{14}ñu^3$	kwa^{14} $xiʔ^{14}ñu^3$	----	i^4-$xiʔ^{14}ñu^3$	'patch up'
$xioʔ^{14}o^4$	kwa^{14} $xioʔ^{14}o^4$	----	i^4-$xioʔ^{14}o^4$	'become ill after having craved a food'
$chaʔ^{14}bi^3$/$chaʔ^4bi^3$	kwa^{14} $chaʔ^{14}bi^3$ kwa^{14} $chaʔ^4bi^3$	$chaʔ^4bi^3$	i^4-$chaʔ^{14}bi^3$ i^4-$chaʔ^4bi^3$ $chaʔ^4bi^3$	'pay'
$chu^{14}tu^2$/chu^4tu^2	kwa^{14} $chu^{14}tu^2$ kwa^{14} chu^4tu^2	chu^4tu^2	i^4-$chu^{14}tu^2$	'kiss'
$xi^{14}ko^3$	kwa^{14} $xi^{14}ko^3$ kwa^{14} xi^4ko^3	xi^4ko^3	i^4-$xi^{14}ko^3$	'sell'
$xi^{14}ta^3$	kwa^{14} $xi^{14}ta^3$ kwa^{14} xi^4ta^3	xi^4ta^3	i^4-$xi^{14}ta^3$ i^4-xi^4ta^3	'pull'
$ya^{14}kun^2$	kwa^{14} $ya^{14}kun^2$ kwa^{14} ya^4kun^2	ya^4kun^2	i^4-$ya^{14}kun^2$ i^4-ya^4kun^2	'massage'
$yuʔ^{14}bi^2$	kwa^{14} $yuʔ^{14}bi^2$ kwa^{14} $yuʔ^3bi^2$	$yuʔ^3bi^2$	i^4-$yuʔ^{14}bi^2$	'get scared'

For irrealis stem verbs with lexical tone /14/ on μ1, 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 negative form. The alternative irrealis forms *xi^{4}ko^2*, *xi^{4}ta^3*, *ya^{4}kun^2* and *yu^{23}bi^2* apparently can occur only after the negative marker *kwa^{14}* (i.e., the affirmative irrealis must have tone /14/ on μ1). However, two irregular forms, *cha^{24}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 (20a) above, the verbs in Table 7 are those whose incompletive form is marked by the prefix *i^4-*. It is to facilitate the visualization of this pattern that we include their incompletive forms there.[26]

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 Ocotepec (Alexander 1988:251), or the prefixes *kw-* or *kV-* in 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 incompletive, as in (26).[27]

(26) ba^{143} ka?^{4}an^2=yu^1
      NEG   INCPL.SPEAK=1SG
      'I do not speak.'

A few incompletive verbs, however, can also accept tonal marking (/14/) of negation. The incompletive verbs that have been identified as accepting tonal as well as segmental marking of negation all have an incompletive 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

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26 Note the verb *i^4-nki^{14}tu^3*, which is based on the contracted trimoraic stem *ni^{1}ki^{4}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.

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

this alternative marking for four verbal lemmas of this type based on Amith and Castillo García's large corpus of YM texts.[28] Notice that the first and fourth verbs have alternative stems for the incompletive at a lexical level with no difference in meaning. The use of the negative form of the incompletive varies greatly depending on the lexical item. For example, for the verb ku^3ni^3 'know', tonal marking of the negative incompletive is found 1,394 times, whereas the syntactic alternative by means of ba^{143} is only found only 22 times. Both options, inflectional vs. syntactic negation, are used with equal frequency for the verb kwi^3in^3 'accept', but for the verbs $kwa\text{?}^1a^3$ 'permit' or ko^3to^3 'see', the tonal encoding is less favoured.

Table 8: Incompletive verbs with negation marked by tone /14/

IRR	INCPL	Corpus occurrences of affirmative INCPL	NEG.INCPL	Corpus occurrences of	
				tonal NEG.INCPL	ba^{143}
ku^3ni^3 'know'	ji^4ni^2	3,483	$ji^{14}ni^2$	1,394	22
	xi^4ni^2	298	$xi^{14}ni^2$	261	
	ji^4ni^3	119	$ji^{14}ni^3$	3	
	xi^4ni^3	45	$xi^{14}ni^3$	1	
kwi^3in^3 'accept'	xi^4in^4	81	$xi^{14}in^4$	59	60
$kwa\text{?}^1a^3$ 'permit'	$xa\text{?}^4a^{13}$	175	$xa\text{?}^{14}a^{13}$	24	86
ko^3to^3 'see'	xi^4to^3	146	$xi^{14}to^3$	2	6
	ji^4to^3	419	$ji^{14}to^3$	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 behaviour of tone in YM to 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.

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28 These four verbs are not the only ones that accept tonal marking of negation in the incompletive. 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 incompletive: ka^3xi^4 IRR, xa^4xi^{24} INCPL, $xa^{14}xi^{24}$ NEG INCPL 'eat', 'bite into'; and $xi\text{?}^{24}in^{13}$ INCPL, $xi\text{?}^{14}in^{13}$ NEG INCPL 'leak' (a house roof) (this verb does not have an irrealis form).

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 $ku^3ki\Omega^4bi^3$ 'be a nuisance' and $xi^3kwi\Omega^4na^4$ 'steal' in Table 9. Other verbs, here called "variant verbs", may have two segmentally distinct stems: $ku^3ka\Omega^3an^3$ 'be ashamed', for example, has one stem for the irrealis mood (and for the negative irrealis) and another for the incompletive and completive aspects The same stem formatives (e.g., *ku-* in Table 9) 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'	Variant verbs (tr) 'steal'	(intr) 'be ashamed'
IRR	$ku^3{+}ki\Omega^4bi^3$	$xi^3{+}kwi\Omega^4na^4$	$ku^3{+}ka\Omega^3an^3$
NEG.IRR	$ku^{14}{+}ki\Omega^4bi^3$	$xi^{14}{+}\,kwi\Omega^4na^4$	$ku^{14}{+}ka\Omega^3an^3$
CPL-1	$ni^1{-}\,ku^3{+}ki\Omega^4bi^3$	$ni^1{-}\,xi^3{+}kwi\Omega^4na^4$	$ni^1{-}\,xi^3{+}ka\Omega^3an^3$
CPL-2	$ku^{13}{+}ki\Omega^4bi^3$	$xi^{13}{+}kwi\Omega^4na^4$	$xi^{13}{+}ka\Omega^3an^3$
INCPL	$ku^4{+}ki\Omega^4bi^3$	$xi^4{+}kwi\Omega^4na^4$	$xi^4{+}ka\Omega^3an^3$

Most YM verbs are invariant: 89 percent of our sample verbs are of this type (495 of 554).[29] 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

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29 As pointed out above, our sample does not include any causative verb with the prefix *sa⁴-*.

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 μ1, the irrealis and CPL-2 forms are indistinct (Table 10, first and third columns, rows 1 and 3). This homophony is avoided, however, with *variant verbs* as in these cases the irrealis stem is not identical to the lexical stem of the incompletive and completive (Table 10, second column):

Table 10: Homophony between irrealis and CPL-2

	Invariant (tr) 'sew'	Variant (tr) 'ask for'	Initial /14/ (intr) 'dream'
IRR	ki^1ku^3	ka^1kan^1	$xa^{14}ni^2$
CPL-2	ki^1ku^3	xi^1kan^1	$xa^{14}ni^2$
INCPL	ki^4ku^{13}	xi^4kan^1	i^4-$xa^{14}ni^2$

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 (27).

(27)			*ku+*	*ka+*	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/ 'ripen, mature' > 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] in conditions that are not entirely clear; there may be some free variation involved. Note also that *ku+* is labialized to [kw][30] when preceding a non-back initial stem vowel (e.g. *ch+achi* /3-3/ 'be torn apart' > IRR.STEM *ku+achi* [kʷachi]). Representative examples of the *ku+* stem class are given in (28). Verbs with variable lexical stems are illustrated in (28b). In a few cases the irrealis is built by adding *ku+* to a verb lacking a stem formative in the lexical form (28c). As the tone melody is independent from segmental changes, we have disassociated the segments from the tone structure.

(28)   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)	'ripen, mature'
ja+nuʔu	ku+nuʔu	/1-1-4/	(intr)	'go back to one's place'[31]
ji+ni	ku+ni	/3-2/	(tr)	'see'
jo+ndaa	ko+ndaa	/3-2-2/	(tr)	'look after'
ju+ndaʔa	ku+ndaʔa	/1-1-3/	(intr)	'remove oneself (from a place)'
ju+eta	ku+eta	/3-3/	(intr)	'be measured'
ki+xin	ku+sun	/1-1/	(intr)	'sleep'
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/	ku+ndeta	/3-3-3/	(intr)	'stand up' (PL sub.)
ndu+ndeta				
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)'

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30 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.
31 Alternative stem: *kwa¹nuʔ¹u⁴*.

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. Representative examples of *ka+* stem class verbs are given in (29).

(29) 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/	(tr)	'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'

As previously noted, 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 (29b).

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 ju^3+nda^3tu^3 'wait', ju^3+ndi^3xi^3 'dress', ja^3+$ndu^{*4}u^4$ 'lie down' and ja^3ta^2 '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 with /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.[32]

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32 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 of the 109 variant verbs are irregular, although most of them could be alternatively analyzed as members of the *ku+* class. The verbs listed in (30) have suppletive irrealis stems that at times also bear tonal melodies that are distinct from those of the lexical stem.

(30)   LEX. STEM   IRR
    a. i^3+xa^3 $a+^3sa^3$ (tr)   'do'[33]
       $ju^3+na^3ni^2$ na^3ni^2 (intr) 'be able to reach out to grab (something)'
       $xi+\text{?}^3i^3$ $ko+\text{ }\text{?}^3o^3$ (tr)   'drink'
       $xa+\text{?}^1an^1$ $ku+\text{?}^1un^1$ (intr) 'go'
    b. $xi+^1xi^1$ $ko+^3ko^3$ (intr) 'get burnt'
       $xi+^1yo^3$ $ko+^3o^3$ (tr)   'be (existential)'
       $xi+\text{?}^1i^1$ $ku+^3u^2$ (intr) 'die'
       $xi+^1ka^3$ $ka+^3ka^3$ (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 comparing YM verbal inflection with patterns found in two other languages within the Mixtec family for which comparable data exists.

5 Conclusion: Yoloxóchitl verbal inflection 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 manifests 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.

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33 The same verb apparently has an alternative lexical stem *ki+xa* /3-3/ and irrealis stem *ka+sa* /3-3/, in the *ka+* class, although these forms now mean (intr) 'copulate' in YM.

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, 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 of tonal and segmental morphology to explore in analyzing 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 authors give three inflected forms: the irrealis (called 'future'), the completive (called 'past') and the incompletive (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, found in complementary distribution. Verbs that have a tone /3/ on μ1 in their lexical representation (i.e., irrealis), receive a tone /2/ in the completive, as in (31a). Verbs with a lexical tone /1/ on μ1 (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 (31b). Among the bimoraic examples in (31), there are also instances of variant verbs of the two classes $ku+$ and $ka+$, again cognate with YM.

(31)   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^1nda^1	ndi^1-ka^1nda^1	(intr)	'move, tremble'
ku^1ni^1	ndi^1-ku^1ni^1	(tr)	'want'
$ka\text{ʔ}^1an^1$	ndi^1-$ka\text{ʔ}^1an^1$	(intr)	'talk'
$nda\text{ʔ}^1i^1$	ndi^1-$nda\text{ʔ}^1i^1$	(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 μ1 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 constrast would be maintained when (i) the stem-initial tone of the irrealis is /3/, or (ii) 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 (32). These verbs form their own inflectional class whose membership appears to be lexically determined.

(32)
IRR	CPL	INCPL		
ku^3-nda^3a^3	xi^1-nda^2a^2	nda^4a^3	(tr)	'look after'
ku^3-na^3ni^4	xi^1-na^2ni^4	na^4ni^4	(intr)	'be called'
ku^3-nda^3tu^3	xi^1-nda^2tu^2	nda^4tu^4	(tr)	'wait for'
ku^3-ndi^3chi^3	xi^1-ndi^2chi^2	ndi^4chi^3	(intr)	'stand' (SG sub.)

For the verbs in (32), 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^3a^3 vs. (CPL) of xi^1-nda^2a^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 (31a). 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 /k/ in all forms.[34]

For the incompletive, when the tonal melody of the base is /1-1/ as in (33a), inflectional tone /4/ overwrites lexical tone /1/ on μ1, just as it does with initial

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

lexical tone /3/, as shown in (33b–c). However, when the melody of the base is /1–3/ or /1–4/, as in (33d–e), the inflectional tone of the incompletive is added onto, but does not replace, the lexical tone /1/ of μ1, resulting into a falling tone on μ1 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/.

(33)		IRR	INCPL	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?^{1}an^1	ka?^{4}an^1	ndi^1-ka?^{1}an^1	(intr)	'talk'
		nda?^{1}i^1	nda?^{4}i^1	ndi^1-nda?^{1}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?^{3}a^3	nda?^{4}a^3	nda?^{2}a^2	(intr)	'get better, recuperate'
c.	/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)
d.	/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?^{1}un^3	ka?$^{F(41)}$un^3	ndi^1-ka?^{1}un^3	(intr)	'burn'
e.	/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'

A summary comparison of the realization of the incompletive in Yoloxóchitl Mixtec and Xochapa Mixtec is given in Table 11 with data of 106 verbs in XM.[35] The number of occurrences of each tonal melody pattern is given in the final column.

For the incompletive form of verbs with lexical melody /1–1/, both YM and XM keep the lexical tone on μ2, but with /3–3/ YM shows a split pattern based on syllable structure (i.e., the inflectional pattern is predictable from stem morphophonology), whereas the split in XM is encoded in the lexicon (i.e., there are

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

no apparent morphological or phonological conditioning elements). For verbs with melodies /1–3/ and /1–4/, XM adds the high tone of the incompletive to the lexical low tone on μ1, resulting in a falling tone, but maintains the lexical tone of μ2. In YM, in contrast, the high tone /4/ of the incompletive replaces the lexical tone /1/ on μ1 which is aligned then to μ2, resulting in a rising tone on μ2. It is worth noting that YM never manifests falling tone on the first mora; the rightward shift of lexical tone /1/ might, therefore, reflect this phonotactic constraint. Finally, for verbs with melody /3–4/, XM preserves lexical tone on μ2 in all cases, whereas syllabic structure is again very relevant for YM, where we find a split between /4–4/ on disyllabic stems and /4–24/ (from underlying /4–34/) on monosyllabic stems.

Table 11: Comparison of the incompletive in bimoraic verbs of YM and XM

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

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 Costa branch of Mixtec (see Figure 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^{1}.[36] This means that the incompletive form is the only form marked by tone, and it is precisely in the tonal patterns found in incompletive that the inflection of SJCM differs from both YM and XM.

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

Table 12: Tonal classes for the incompletive in SJCM.

CLASS		LEX		IRR	CPL	INCPL			
I	17	/1-1/	kwa¹	ka¹an¹	ka¹an¹	/3-3/	ka³an³	(tr)	'bite'
	31	/1-2/	kwa¹	kaʔ¹yɨ²	kaʔ¹yɨ²		kaʔ³yɨ³	(tr)	'paint'
	1	/3-2/	kwa¹	ko¹kon²	ko¹kon²		ko³kon³	(tr)	'swallow'
96	47	/2-2/	kwa¹	nu²ña²	nu²ña²		nu³ña³	(tr)	'open'
II	5	/1-1/	kwa¹	ndɨ¹yɨ¹	ndɨ¹yɨ¹	/3-2/	ndɨ³yɨ²	(intr)	'get scorched'
	4	/1-2/	kwa¹	tsi¹yo²	tsi¹yo²		tsi³yo²	(intr)	'have diarrhea'
29	20	/2-2/	kwa¹	ki²ku²	ki²ku²		ki³ku²	(tr)	'sew'
III	4	/1-1/	kwa¹	nda¹tsi¹	nda¹tsi¹	/3-1/	nda³tsi¹	(intr)	'become loose'
	1	/1-2/	kwa¹	na¹ñi²	na¹ñi²		na³ñi¹	(tr)	'hit'
6	1	/2-1/	kwa¹	kaʔ²yɨ¹	kaʔ²yɨ¹		kaʔ³yɨ¹	(intr)	'use make-up'
IV	20	/1-1/	kwa¹	kaʔ¹an¹	kaʔ¹an¹	/2-3/	kaʔ²an³	(tr)	'talk'
	3	/1-2/	kwa¹	ja¹ta²	ja¹ta²		ja²ta³	(tr)	'buy'
	21	/2-1/	kwa¹	ndaʔ²ba¹	ndaʔ²ba¹		ndaa²ba³	(tr)	'switch off'
48	4	/2-2/	kwa¹	naʔ²ma²	naʔ²ma²		naʔ²ma³	(tr)	'confess'

Verbs in classes I to III have a high tone /3/ on µ1 of the incompletive. 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 incompletive 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

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36 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 µ1. This point was discussed in section 4.2.3.

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 incompletive 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-Manguean 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 & Palancar, this volume), Triqui (DiCanio, this volume), Mazatec (Léonard & 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 should be given priority before it is too late.

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References

Alexander, Ruth Mary. 1988. A syntactic sketch of Ocotepec Mixtec. In C. Henry Bradley and Barbara E. Hollenbach, (eds.), *Studies in the syntax of Mixtecan languages*, volume 1, 151–304. Dallas and Arlington, Texas: Summer Institute of Linguistics and University of Texas at Arlington.

Alvarado, Fray Francisco de. 1962 [1593]. *Vocabulario en lengua misteca*. Mexico City: Instituto Nacional Indigenista and Instituto Nacional de Antropología e Historia.

Amith, Jonathan D., and Rey Castillo García. n.d. 1. A dictionary of Yoloxóchitl Mixtec. Ms.

Amith, Jonathan D., and Rey Castillo García. n.d. 2. A grammar of Yoloxóchitl Mixtec. Ms.

Beaty de Farris, Kathryn. 2002. *Diccionario básico del mixteco de Yosondúa, Oaxaca*. In collaboration with Pablo García Sánchez, Rubén García Sánchez, Jesús Ojeda Sánchez, Augustín San Pablo García and Apolonio Santiago Jiménez. Mexico City: Instituto Lingüístico de Verano.

Bradley, C. Henry. 1970. *A Linguistic Sketch of Jicaltepec Mixtec*. Summer Institute of Linguistics Publications in Linguistics and Related Fields, 25. Normal, Okla.: Summer Institute of Linguistics and University of Oklahoma.

Bradley, C. Henry and Barbara Hollenbach, eds. 1988–92. *Studies in the syntax of Mixtecan languages*. 4 vols. Dallas and Arlington, Texas: Summer Institute of Linguistics and the University of Texas at Arlington. (I: Introduction and syntactic sketches of Jamiltepec, Ocotepec, Silacayoapan; II: Ayutla, Coatzosapan; III: Alacatlatzala, Diuxi-Tilantongo, Concepción Pápalo Cuicatec; IV: Yosondúa, Copala Trique).

Campbell, Lyle, Terrence Kaufman, and Thomas C. Smith-Stark. 1986. Meso-America as a linguistic area. *Language* 62:530–70.

Castillo García, Rey. 2007. La fonología tonal del mixteco de Yoloxóchitl, Gro. MA thesis Centro de Investigaciones y Estudios Superiores en Antropología Social, Mexico City, Mexico.

DiCanio, Christian T., Caicai Zhang, Jonathan D. Amith, Rey Castillo García, and Douglas H. Whalen. Forthcoming. Phonetic structure in Yoloxóchitl Mixtec consonants. *International Journal of American Linguistics*.

Ferguson de Williams, Judith. 2007. *Gramática popular del mixteco del municipio de Tezoatlán, San Andrés Yutatío, Oaxaca*. Serie gramáticas de lenguas indígenas, 9. Mexico City: Instituto Lingüístico de Verano.

Fishman, Joshua. 1991. *Reversing language shift: Theoretical and empirical foundations of assistance to threatened languages*. Clevedon, England: Multilingual Matters.

Hills, Robert A. 1990. A syntactic sketch of Ayutla Mixtec. In C. Henry Bradley and Barbara E. Hollenbach, (eds.), *Studies in the syntax of Mixtecan languages*, volume 2, 1–260. Dallas and Arlington, Texas: Summer Institute of Linguistics and University of Texas at Arlington.

Hinton, Leanne, Gene Buckley, Marv Kramer, and Michael Meacham. 1991. Preliminary analysis of Chalcatongo Mixtec tone. In James E. Redden, (eds.), *Papers from the American Indian Languages Conferences held at the University of California, Santa Cruz, July and August 1991*. Occasional Papers on Linguistics No. 16, 173–82. Carbondale: Southern Illinois University.

Hollenbach, Barbara E. 2001. The Lord's Prayer from the 1567 Hernández cathechism. Downloaded at http://barbaraelenahollenbach.com/Bibliography.htm#Mixtec_Mixtecan.

Johnson, Audrey F. 1988. A syntactic sketch of Jamiltepec Mixtec. In C. Henry Bradley and Barbara E. Hollenbach, (eds.), *Studies in the syntax of Mixtecan languages*, volume 1, 11–150. Dallas and Arlington, Texas: Summer Institute of Linguistics and University of Texas at Arlington.

Josserand, Judy K. 1983. Mixtec dialect history. PhD thesis, Tulane University.

Macaulay, Monica. 1996. *A grammar of Chalcatongo Mixtec*. University of California Publications in Linguistics 127. Berkeley: University of California Press.

Macaulay, Monica, and Joseph C. Salmons. 1995. The phonology of glottalization in Mixtec. *International Journal of American Linguistics*, 61:38–61.

McKendry, Inga. 2013. Tonal association, prominence and prosodic structure in south-eastern Nochixtlán Mixtec. PhD thesis, University of Edinburgh.

Overholt, Edward. 1961. The tonemic system of Guerrero Mixtec. In Manuel Gamio and Raúl Noriega, (eds.), *A William Cameron Townsend en el vigésimoquinto aniversario del Instituto Lingüístico de Verano*, 597–626. Mexico City: Instituto Lingüistico de Verano.

Ramírez Flores, Esperanza (narrator), and Candice Brown de Beatham. 2012. *Tu'un na ñuu Kiyaa. Mixteco del oeste de Juxtlahuaca*. Electronic version. 2nd edition. Mexico City: Instituto Lingüístico de Verano.

Small, Priscilla C. 1990. A syntactic sketch of Coatzospan Mixtec. In C. Henry Bradley and Barbara E. Hollenbach, (eds.), *Studies in the syntax of Mixtecan languages*, volume 2, 261–479. Dallas and Arlington, Texas: Summer Institute of Linguistics and University of Texas at Arlington.

Smith Stark, Thomas. 1995. El estado actual de los estudios de las lenguas mixtecanas y zapotecanas. In Leonardo Manrique, Yolanda Lastra, and Doris Bartholomew, (eds.), *Panorama de los estudios de las lenguas indígenas de México*, 2 vols. Colección Biblioteca Abya-Yala 16, 5–186. Quito, Ecuador: Ediciones Abya-Yala.

Smith Stark, Thomas. 1994. Mesoamerican calques. In Carolyn J. MacKay and Verónica Vázquez, (eds.), *Investigaciones lingüísticas en Mesoamérica*, 5–186. Mexico City: Universidad Nacional Autónoma de México.

Smith Stark, Thomas. 1982. Mesoamerican calques. Paper presented at the symposium on Mesoamerican dialectology and language history, 44th International Congress of Americanists, Manchester, England.

Stark, Sharon (Sara), Audrey (Andrea) Johnson P., and Benita Gonzalez de Guzman. 2006. *Diccionario básico del mixteco de Xochapa, Guerrero*. Segunda edicion. Mexico City: Instituto Lingüístico de Verano.

Stark Campbell, Sara, Andrea Johnson Peterson, Filiberto Lorenzo Cruz (compiladores), and Catalina López de García, Daniel Fidencio García Alavez (colaboradores mixtecos). 1986. *Diccionario mixteco de San Juan Colorado*. Serie de Vocabularios y Diccionarios Indígenas "Mario Silva y Aceves", no. 29. Mexico City: Instituto Lingüístico de Verano.

Suárez, Jorge A. 1983. *The Mesoamerican Indian languages*. Cambridge, England: Cambridge University Press.

Thornton, Anna M. 2011. Overabundancy (Multiple forms realizing the same cell): A non-canonical phenomenon in Italian. In Maria Goldbach, Marc-Olivier Hinzelin, Martin Maiden, and John Charles Smith, (eds.), *Morphological Autonomy*, 362–85. Oxford: Oxford University Press.