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Inflectional class complexity in the Oto-Manguean languages

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Abstract: In this paper we introduce the object of study of this special issue of *Amerindia*, the inflectional classes of the Oto-Manguean languages of Mexico, together with their most relevant typological characteristics. These languages are rich both in the variety of their inflectional systems, and in the way these are split into inflection classes. In effect, the full typological range of possible inflection class systems can be found just in this one stock of languages. This is illustrated through a survey of the variety of morphological forms, assignment principles, and paradigm structure, as well as the effects of combining multiple inflection class systems across different exponents within a single word form.

Keywords: Oto-Manguean, inflectional classes, morphological complexity, morphological typology

Introduction

Inflectional morphology expresses grammatical information and in an ideal world each distinct form would correspond to a distinct meaning. But in reality we find that inflectional morphology can be a source of systemic complexity, with inflectional markers displaying apparently unmotivated morphological differences. Often such inflectional allomorphy pervades the entire paradigm so that a given word class falls into morphologically distinct inflectional classes. Inflectional classes are seemingly useless in functional terms, and yet they are found across languages and are resilient over time, adding a layer of complexity to the linguistic system which is purely morphological.

Current knowledge of inflectional classes is still largely based on European languages and is thus limited by their typological characteristics, but in no language family on the planet –we would claim– are inflectional classes better represented than in the Oto-Manguean languages of Mexico. This is not just because so many of the languages across the family manifest inflectional class distinctions, but because of the wide morphological variety they manifest, and the intricacies of their organization.

Oto-Manguean languages are notable for the richness of their morphology, and they display all the relevant typological possibilities for the study of inflectional classes. The family includes from relatively simple systems to the most complex inflectional class systems ever described. Sometimes the sheer number of classes, their unpredictability, and the layering of cross-classifying systems of affixation, tone and stem alternations present both descriptive and theoretical challenges. The current special issue of *Amerindia* features articles by leading figures in the field with new data and new perspectives on the inflectional systems of one of the most remarkable linguistic families in the world.

1. Oto-Manguean

Oto-Manguean (also spelled ‘Otomanguean’) is a large family (also often treated as a linguistic phylum) of Amerindian languages spoken in villages and small towns in Central and Southern Mexico.¹ Although the 2005 census by the INALI² estimates the number of speakers to be slightly above 1,700,000, of which 200,000 are said to be monolingual, these figures are over optimistic. In reality, many of the languages are threatened because they are no longer learned by children and some are already critically endangered (for example Tilapa Otomi or Ixcatec). Oto-Manguean consists of the eight different linguistic groups (Figure 1).³

¹ The three Oto-Manguean languages outside of the Mexican territory (i.e., Subtiaba[†] (Nicaragua; Tlapanecan); Monimbo[†] (Nicaragua; Manguean); and Chorotega[†] (Costa Rica; Manguean) are now extinct.

² National Institute for Indigenous Languages.

³ In Campbell (1997) one can find a more traditional taxonomy, which is in turn based on unpublished materials by Terrence Kaufman. In his proposal, Oto-Manguean is thought to be divided into two large groups which in turn each consist of two major branches: (i) Western Oto-Manguean consisting of Oto-Pamean-Chinantecan and Tlapanecan-Manguean; and (ii) Eastern Oto-Manguean formed of Amuzgo-Mixtecan and Popolocan-Zapotecan. We prefer to adopt Palancar's (2016) flat approach to the family because this taxonomy has not yet been discussed at length.

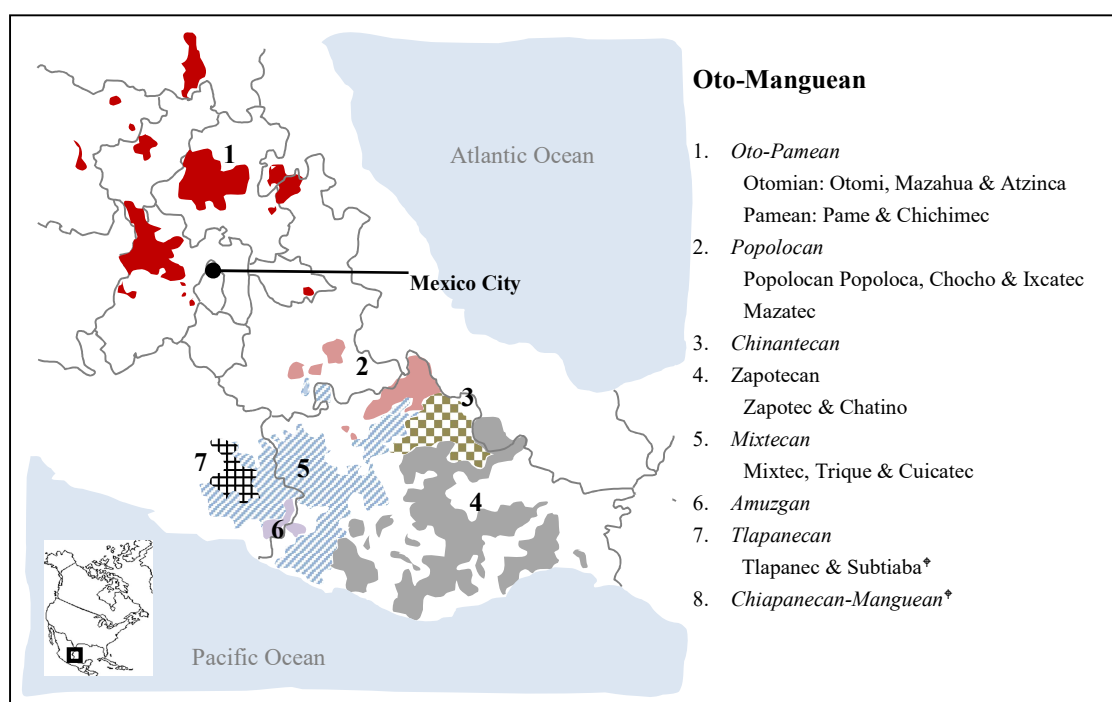


Figure 1. The Oto-Manguean languages of Mexico (Palancar 2016)

While there is a general consensus among scholars nowadays about what languages belong to the family,⁴ the actual number of languages is still open to question, since the many dialectal continua make a categorical identification of languages difficult. The figures vary from source to source; while the Ethnologue proposes 176 different languages and the Glottolog 179, the INALI, giving more importance to sociolinguistic factors, establishes the existence of 220 in the CLIN (2008).

Phonologically, all Oto-Manguean languages are tonal, although the tonal systems differ greatly from branch to branch. There is an overwhelming tendency towards open syllables, especially at root level. Languages often have nasal vowels and complex phonation types. Morpho-syntactically, all languages are head-marking. Nouns do not inflect for case, although they may receive classifiers, and their possessive inflection can be at times challenging. In some branches, animacy or the discourse

⁴ Recently, Brown (2015) questioned the validity of the comparative evidence that has traditionally been used to justify the existence of the family. Brown's proposal is that Oto-Manguean would be better seen as a Sprachbund.

status of a noun is also relevant for the inflection. Oto-Manguéan languages lack non-finite forms such as infinitives, and this has consequences for the syntax of clause chaining. At the level of word order, all branches can be characterized as verb initial (also a Mesoamerican feature according to Campbell *et al.* 1986), but some innovative languages have become predominantly SVO. Oto-Manguéan languages are largely fusional, in many ways resembling Indo-European languages in how they exhibit both fused morphemes as well as a large deal of transparent affixation. Their derivational morphology is largely unproductive; new words are often borrowed and often lie outside the scope of the more morphological aspects of the inflection.

Overall, the internal diversity of the family makes an overall inventory of typological features untenable, except for the two phenomena already mentioned: tone and verbal inflectional classes. Our interest in this special issue lies in inflectional classes (for more specifics about the role of tone in inflection, see Palancar 2016 and Palancar & Léonard 2016). A specific interest in inflectional classes led the Surrey Morphology Group to create a large lexical and morphological database (Feist & Palancar 2015), which contains information of the verbal inflectional classes of 20 different Oto-Manguéan languages. This database is freely accessible to the public at <http://www.oto-manguéan.surrey.ac.uk/> and contains large datasets that have already been put to use in some of the contributions of this special issue, for example in Campbell on Zenzontepec Chatino; in Hernández-Green on Acazulco Otomi; and in Palancar & Avelino on Chichimec.

The present special issue concentrates on a subset of the Oto-Manguéan languages. In previous work, we have looked at aspects of Chinantecan inflectional complexity (see Baerman 2014, Baerman & Palancar 2014, Palancar 2014, Palancar 2015) and of Mixtecan (see Feist & Palancar 2016 and Palancar, Amith & Castillo 2016). Here we present additional contributions to the study of inflectional classes of the other surviving six groups of Oto-Manguéan, for which information has so far been more limited: Tlapanecan or Meʔpá in Wichmann; Zapotecan in Campbell, in Woodbury, in Beam de Azcona and in López Nicolás; Popolocan in Léonard & Fulcrand; Amuzgan in Kim; and Oto-Pamean in Hernández-Green and in Palancar & Avelino.

2. Typology of inflection classes in Oto-Manguean

The inflectional patterns of the Oto-Manguean languages are so rich and so varied that the full range of variation observed cross-linguistically can, arguably, be found in this one family. In order to locate the present contributions within the broader typological picture, we survey here the major parameters relevant for understanding the inflection class systems of the Oto-Manguean languages (or indeed any language manifesting inflection class distinctions).

2.1. Forms

The Oto-Manguean languages amply demonstrate that inflection class distinctions can be manifested across any type of inflectional exponent: suffixes, prefixes, tone, stem alternations, even clitics, all are fair game. So in one sense we can talk about a language's inflection class system independently of the actual morphological details. But the nature of the inflectional forms may well influence how we interpret these systems. At the simplest level we might segment off inflectional morphology from lexical morphology, giving us in effect 'pure' inflection class. Take for example the two Zenzontepec Chatino verb paradigms in Table 1. In each case there is a portion of the word form that remains unchanged across the aspect-mood paradigm, and a portion that changes. We can then factor out the unchanging portion as being merely lexical material --*xiti* means 'laugh' and *-tʷāá* means 'turn in'-- so that we end up with different classes of prefix paradigms.⁵

| | | | | | |
|------|---------|----------------------|---|----------|--------------------|
| | 'laugh' | 'turn in' | | class Ac | class A2 |
| CPL | nkaxiti | nk ^w tʷāá | → | nka- | nk ^w i- |
| PROG | ntexiti | ntētʷāá | | n-te- | n-te- |
| HAB | ntixiti | ntītʷāá | | nti- | nti- |
| POT | kixiti | tʷāá | | ki- | ∅ |

Table 1. Prefixal classes in Zenzontepec Chatino (Campbell, this issue)

Tonal inflection is endemic Oto-Manguean, and in a sense lends itself to segmentation in the same way as prefixes or suffixes. So in the Usila

⁵ In fact, the segmentation may be less straightforward than this, at least when viewed in the larger systemic context (see Campbell, this issue). I use these simple examples for purposes of illustration.

Chinantec verbs in Table 2, we can extract the tonemes out of the word forms and display them as inflectional paradigms in their own right.

| | | | | | |
|---------|---------------------|--------------------|---|---------|---------|
| | ‘cut’ | ‘cross’ | | class A | class B |
| 1SG PRS | tei ³⁴ | ʔa ⁵ | → | 34 | 5 |
| 1PL PRS | tei ⁴ | ʔa ⁵ | | 4 | 5 |
| 2 PRS | tei ³ -ʔ | ʔa ⁵ -ʔ | | 3 | 5 |
| 3 PRS | tei ²³ | ʔa ²³ | | 23 | 23 |

Table 2. Tonal classes in Usila Chinantec (Skinner & Skinner 2000)

There is a difference though. In the Chatino example, the segmented portions retain a degree of autonomy, e.g. unprefixed stems exist, such as *vāá*, the potential of ‘turn in’, so it is possible to point to plausible linguistic objects and call them either lexical or inflectional morphology. But in the Chinantec example neither element that results from segmentation is a viable linguistic object. Tone is a necessary property of any Chinantec syllable, so segmental sequences without tone are phonologically deficient. And tone without segmental content (be it only a vowel) makes no sense. So it is less clear that we are justified in seeing the tonal paradigm in Table 2.

The interplay of lexical and inflectional properties of morphological forms is even more apparent in the motley collection of phenomena broadly characterizable as *stem alternations*, which is also widely attested. For example, the Tlapezco Chinantec verbs in Table 3 show various differences between 3rd person forms and the rest. In ‘pull’ the initial consonants differ, in ‘lay’ the stem vowels differ, and in ‘get’ both the stem vowels and the final consonant differ. Various considerations, in particular the idiosyncratic nature of such alternations and the fact that the majority of verbs do not manifest any such segmental changes, favour interpreting these as stem alternations, which is to say, variation in the lexical material.

The significance of that in the present context is that it offers another way of representing inflection class distinctions, namely in terms of patterns rather than forms. That is, if inflection classes are a matter of inflectional rather than lexical material, then the phonological details of the alternations in Table 3 are, arguably, beyond our consideration. But the stem alternations is part of the verbs’ inflectional paradigm, so at least the fact that some verbs have them and some don’t must represent some kind of

inflection class distinction, and within that, the different patterns of alternation (see §2.2). From a descriptive and typological perspective the important thing is that we can recognize different, possibly independent patterns of regularity within inflectional systems (see §5), as well as to abstract patterns out of phonological detail.

| | ‘pull’ | ‘lay’ | ‘get’ |
|-------|---------------------|-------------------|---------------------|
| NON-3 | juanh ³ | jioh ³ | jniang ² |
| 3 | tsanh ¹² | jiúh ² | jniuh ² |

Table 3. Tonal alternations in Tlatepuzco Chinantec (Merrifield & Anderson 2007)

Affixal, prosodic and stem classes are all cross-linguistically familiar manifestations of inflection class. Alongside these, we find in one branch of Oto-Manguean a type of extreme rarity, namely apparent inflection class distinctions in clitics, found with the TAM-subject person markers in Otomian languages, as in the example from Tilapa Otomi in Table 4 (see also Hernández-Green on Acazulco Otomi, this issue).

| | ‘water’ | ‘cut wood’ | ‘pray’ |
|------------|-----------|------------|-----------|
| IRR INCP 1 | gu= xithe | gutu xu | giti xadi |
| IRR INCP 2 | gi= xithe | gugu xu | giti xadi |
| IRR INCP 3 | ta= xithe | ti= xu | ti= xadi |

Table 4. Clitic-based inflection classes in Tilapa Otomi (Palancar 2012)

At first glance this resembles the sort of thing we seen in auxiliary selection in e.g. French or Italian, where verbs select the ‘be’ or ‘have’ auxiliary in perfect constructions. In these cases it is usually argued that the choice is determined by the verb’s argument structure. That does not appear to be a tenable analysis for Otomian; first because the TAM-subject clitics are not verbs, and second, because the major class distinctions have no observable correlates outside of morphology. (That said, there may be morphological alternations WITHIN these classes that do depend on argument structure.) If it is really the case that arbitrary inflection class membership inherent to one word can be realized on another, that would be a serious challenge to the notion of morphology-free syntax (Zwicky 1996), at least to the extent that clitic selection here is understood as syntactic. Alternatively, we can construe the verb and its associate as a single morphological form, which it resembles in most respects, perhaps as

a stage in the process of univerbation that we see already realized in Mazatec (Léonard & Fulcrand, this issue).

2.2. Allomorphy

The notion of inflection classes is, in the first instance, based on allomorphy, where allomorphy is understood as a morphological difference not attributable to some other linguistic component. But we know that allomorphy has different sources: in some cases we have what used to be a single formative which split due to phonological change, in other cases there were two or more etymologically distinct formatives from the outset. While the distinction may play no direct role in the synchronic system, much less in the minds of language users, it may be the source of different patterns of lexical class distribution, as well as different paradigm configurations.

At its most transparent, phonologically-driven allomorphy is reducible to morphophonological rules. Consider the vowel suffixes of the Chiquihuitlán Mazatec verbs in Table 5. These are plausibly derived from a single base form (the 3rd person) via the morphophonological rules in (1).⁶

| | ‘stack’ | ‘close’ | ‘remember’ | ‘roof’ | ‘throw away’ | ‘reach’ |
|----------|---------------------------------|-----------------------------------|---------------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| 1SG | be ¹ šo ¹ | be ³ čha ¹ | ba ³ sæ ¹ | ba ³¹ tæ ¹ | ka ³ ntæ ¹ | be ¹⁴ ču ³ |
| 2SG | be ² še ² | be ³ če ¹ | ča ² se ² | ba ³ te ¹ | ča ³ nti ¹ | be ¹⁴ či ³ |
| 3 | be ² šo ² | be ³ čha ¹ | ba ³ se ² | ba ³ tæ ¹ | ka ³ nti ¹ | be ³ ču ¹ |
| 1INCL PL | be ² šō ² | be ³ čhã ³¹ | ča ² sē ² | ba ³ tē ³¹ | ča ³ ntē ³¹ | be ¹⁴ čũ ⁴² |

Table 5. Chiquihuitlán Mazatec verbs (Jamieson 1982)⁷

(1) Possible morphophonological rules to derive the classes in Table 5

- 1SG = front stem V → /æ/
- 2SG = low or mid stem V → /e/, high stem V → /i/
- 3 = stem V
- 1INCL PL = front stem V → /æ/, nasalization

Indeed, more conservative varieties show that these classes go back to the fusion of an invariant set of suffixes with the various stem-final vowels still evident in the 3rd person forms (Pike 1948: 118-119; Léonard &

⁶ Intransitives show a similar alternation, though of course in the case of inanimates we only have the 3rd person forms.

⁷ 1PL exclusive and 2PL are not shown, as these have the same suffix for all verbs.

Fulcran, this issue). The more phonological change obscures the conditioning factors, the further we move into the realm of pure morphology. Thus, to judge from parallel developments in other Oto-Manguan languages, the Chinantecan tonal classes probably arose from the fusion of stem tone and affix tone, but now there is no trace of a phonological motivation. In both these cases the classes were historically determined by phonological properties of the stem. To the extent that the relevant portion of the stem itself was not a product of some motivated word-formation process, the result is wholly arbitrary inflection classes.

But allomorphy may also have a functional origin; that is, different markers with different functions which, through reanalysis, have come to be treated simply as variant forms of the same thing. The Mazatec prefixal stem formatives (Léonard & Fulcran, this issue) are a particularly clear example. Such verbs were originally compounds consisting of a light verb followed by a lexical verb; these are still found as separate lexemes in the more conservative Huautla Mazatec, where Pike (1948) gives as examples of the most frequent ones ‘carry’, ‘change direction of’, ‘deposit’, ‘make’, and ‘place’. The inflection classes as defined by these prefixes thus go back to what were quite simply lexical distinctions between different verbs. Of course, the presumed functional origin of some morphological distinctions leads to situations where the distinction between motivated and arbitrary classes is fluid, to say the least (see §3).

2.3. Distribution

So far we have dealt with inflection classes as an extension of allomorphy, but have thereby glossed over an important distinction. In the clearest manifestation of allomorphy, a formative X found with one word in one paradigmatic cell corresponds to a formative Y found with another word in the same paradigmatic cell. But consider the contrast between class II and class III in Acazulco Otomi shown in Table 6 (an extract of the whole paradigm, but one which shows the range of distributional differences between the two classes). The two classes differ in the form of the proposed inflectional formative, e.g. REAL INCP 1 *drá* for class I vs *drádi* for class II, where the class III form has an extra *-di* suffix. We could go through the paradigm on a cell-by-cell basis and make similar

comparisons, observing e.g. that in the REAL CPL 1 class II has an extra *-di* suffix, that in IRR CPL 1 both classes have a *-di* suffix, while in the REALIS CPL 3 neither class has a *-di* suffix. But such a narrow view of things would cloud the fact that the two classes have exactly the same repertoire of morphological formatives, and differ only in their paradigmatic distribution.

| | | | verbs | | clitic-final suffix | |
|------|-------|---|--------------------|---------------------|---------------------|-----|
| | | | class II 'walk' | class III 'give' | II | III |
| REAL | INCPL | 1 | drá 'yo=ga | drádí 'ün=ga | Ø | di |
| REAL | INCPL | 2 | grá 'yo | grádí 'üni | Ø | di |
| REAL | INCPL | 3 | ra 'yo | radí 'üni | Ø | di |
| REAL | CPL | 1 | dídí 'yo=ga | dí 'ün=ga | di | Ø |
| REAL | CPL | 2 | gídí 'yo | gí 'üni | di | Ø |
| REAL | CPL | 3 | bi 'yo | bi 'üni | Ø | Ø |
| IRR | CPL | 1 | gidi 'yo=ga | gidi 'ün=ga | di | di |
| IRR | CPL | 2 | gidi 'yo | gidi 'üni | di | di |
| IRR | CPL | 3 | di 'yo | di 'üni | Ø | di |

Table 6. Distribution of *-di* in an extract the Acazulco Otomi verb paradigm (Hernández-Green, this issue)

In effect, the two classes differ in the shape of the paradigm, i.e. in the distribution of \emptyset and *-di* forms, rather than in the shape of the formatives that make up the paradigm. While this is fairly unusual with transparently affixal formatives, it is not uncommon with tonal paradigms, where the limited repertoire of formative types means that tonal classes will seldom be defined by unique tones. And similarly with stem alternations, to the extent that stem alternants are identified by abstract properties (e.g. 'palatal stem' vs 'plain stem' in the San Pedro Tlapeuzco Chinantec examples in Table 12) and not the full details of their phonological form.

2.4. Assignment

The reason to posit inflection classes is to reserve a morphological category to accommodate inflectional variants that have no obvious explanation within any other component of language (phonology, semantics, syntax). But of course, actual systems often defy compartmentalization, and the assignment of a lexeme to a particular inflection class may draw upon more than just arbitrary morphological

stipulation. For example, as shown in (1), the Mazatec suffix classes illustrated above can plausibly be represented as a morphophonological operation on the 3rd person forms, so that inflection class membership is derivable from (or perhaps just another name for) phonological class membership. At one remove from this is the morphophonological determination of class membership, as in Kim's analysis of Amuzgo , where both phonological properties (the presence of particular segmental phonemes) and morphological properties (the morphological status of the segment within the word form) play a role in determining the inflectional pattern.

We face a more difficult task of delimitation where the assignment principle appears to be functional, since that touches at the very heart of what it means to have inflection classes. This is the case with the prefixes classes in Matlatzinca (Palancar & Carranza 2017). Verbs are divided into six classes with distinct inflectional markers. Three of these are reserved for transitive verbs and two for intransitive verbs. Many verbs can inflect either according to one of the transitive patterns or one of the intransitive patterns. In that case we may instead wish to say that the morphological differences instead realize a transitivity alternation, and thus fail to meet the criterion of arbitrariness that is a defining property of inflection classes. But the fact remains that within each set of verbs (transitive and intransitive) class membership must still be specified, as well as the mapping between transitive and intransitive classes, so we are faced at best with a mixed state of affairs.

2.5. Paradigm structure

In one sense inflection classes are a manifestation of allomorphy, allomorphy that plays out across multiple members of a paradigm and not just individual formatives. How these sets of allomorphs interact is an important typological parameter, and indeed is one of the most intensively studied aspects of inflection classes in morphological theory. Systems range from the relatively simple, where much of the overall allomorphy is predictable, to the complex, where it is not.

The suffix paradigms from Chiquihuitlán Mazatec, presented in Table 5, represent a relatively simple type. The suffixes are separated out in

Table 7. Verbs fall into five classes, all of which are instantiated in the 3rd person forms, which display five allomorphs. A useful way of conceptualizing this is in terms of principal parts, namely the forms one would need to know in order to unambiguously identify a word's inflectional class (Stump and Finkel 2013). In these terms the 3rd person form is sufficient to identify what inflection class any verb belongs to.

| | 'stack' | 'close' | 'remember' | 'roof' | 'throw away' | 'reach' |
|----------|---------|---------|------------|--------|--------------|---------|
| 1SG | o | a | æ | | | u |
| 2SG | e | | | | i | |
| 3 | o | a | e | æ | i | u |
| 1INCL PL | õ | ã | ẽ | | | ũ |

Table 7. Chiquihuitlán Mazatec suffixes from table 5

The Lealao Chinantec paradigms in Table 8 represent a more complex type. Verbs fall into six classes on the basis of their subject-marking suffixes.⁸ But for no morphosyntactic value are there actually six allomorphs: the 3SG has three, while the 1SG and 2SG each only have two. Six classes emerge because the suffix allomorphs cross-classify; e.g. depending on the lexeme, either of the two 1SG allomorphs occurs with either of the two 2SG allomorphs. The suffixes are separated out in Table 9 to make things clearer. The defining characteristics of the inflection classes are thus spread across the paradigm. In this case one principal part is not enough to establish what class a verb belongs to. For the 'be cold' or 'run somebody over' type it would be sufficient to know the 3SG form, as this is unique, but for the others one would need two or even three (in the case of the 'be ashamed' or 'receive something' type); only in this way are the multiple cross-classifying possibilities resolved. Measured in these terms, this system is more complex than Chiquihuitlán Mazatec, (*sth* 'something', *sb.* 'somebody')

| | 'tie sth.' | 'treat sb' | 'be ashamed' | 'receive sth.' | 'be cold' | 'run sb. over' |
|-----|-------------------------------------|---|---|---|--|---|
| 1SG | ʔi ² ñuu ⁴² y | ʔi ² hmeéʔ ⁴ á ⁴ | ʔi ⁴ hii ⁴ y | ʔi ⁴ tón ⁴ á ⁴ | ʔi ⁴ gwii ⁴ y | ʔi ² heé ² á ⁴ |
| 2SG | ʔi ² ñuu ³ y | ʔi ² hmeey ¹ ʔ | ʔi ⁴ hii ⁴ u ³ | ʔi ⁴ tón ⁴ u ³ | ʔi ⁴ gwii ² u ³ | ʔi ² heé ² u ³ |
| 3SG | ʔi ⁴ ñuu ⁴ | ʔi ⁴ hmeé ⁴ ʔ | ʔi ⁴ hii ⁴ | ʔi ⁴ tón ⁴ | ʔi ⁴ gwii ⁴ ʔ | ʔi ⁴ heé ² |

Table 8. Suffix classes in Lealao Chinantec (Rupp & Rupp 1996; Palancar 2015)

⁸ Plural subject values are derived by additional and entirely regular affixation to these forms, and are not shown here.

| | | | | | | |
|-----|------------|----------------|----------------|----------------|-----------|----------------|
| | ‘tie sth.’ | ‘treat sb’ | ‘be ashamed’ | ‘receive sth.’ | ‘be cold’ | ‘run sb. over’ |
| 1SG | y | á ⁴ | y | á ⁴ | y | á ⁴ |
| 2SG | y | | u ³ | | | |
| 3SG | Ø | | | | ? | y |

Table 9. Suffixes from Table 8

Oto-Manguean languages are notorious for this sort of complex inflection class organization. Above all this is manifested in the tonal paradigms of the Chinantecan languages. Consider the paradigms in Table 10, again from Lealao Chinantec. In order to keep things from getting out of hand, this shows just a small fragment of the system: only present forms, and only those whose 1SG form has tone 32. The greatest number of allomorphs for any one value is five, yet because of their cross-classifying distribution across lexical groups we get 14 inflection classes. This pattern is carried over on a larger scale to the entire tonal paradigm, embracing complete and future forms as well, 1SG forms with other tones, to yield over 100 inflection classes.

| | tonal allomorphs | i | ii | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv |
|-----|------------------|----|----|-----|----|----|----|-----|------|----|----|----|-----|------|-----|
| 1SG | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| 1PL | 32, 42 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 42 | 42 | 42 | 42 | 3+ | 4+ |
| 2 | 3, 4, 32, 3+, 4+ | 3 | 4 | 4 | 32 | 32 | 3+ | 4+ | 4+ | 4 | 3+ | 3+ | 3+ | 3+ | 32 |
| 3 | 3, 4, 32, 3+, 4+ | 32 | 3 | 32 | 3 | 32 | 32 | 3 | 32 | 4 | 4 | 32 | 4+ | 3+ | 4+ |

Table 10. Some tonal classes in Lealao Chinantec (Rupp & Rupp 1996)

2.6. Combining classes

A corollary of the morphological variety of inflection class realizations described in the preceding section is that inflection class systems may be overlaid. E.g. in Lealao Chinantec, suffixes, tone and stem alternations are all employed in inflection, and each is divided up into different inflection classes. To the extent that such layered systems are independent of each other, that multiplies the sort of complexity described, e.g. for Lealao Chinantec, whatever burden is placed on the language user to sort out tone class membership is added to the burden required to sort out suffix class membership, and so on.

Oto-Manguean languages abound in such cross-classifying multiple inflection classes, as the contributions to the present special issue amply

show, for example the juxtaposition of affix and tone classes found in the Chatino languages, discussed for Zenzontepec by Campbell, or more broadly for the whole family by Woodbury. Stem alternations alongside affix (or clitic) classes are illustrated for Oto-Pamean languages (on Otomi, Hernández-Green, and on Chichimec, Palancar & Avelino) and for Zapotecan (López Nicolás). Of particular interest are those instances where multiple systems appear to be in some way coordinated. This is true to some extent of the Zapotecan languages, where the co-occurrence of affixal, prosodic and stem alternation patterns allows one to speak of inflection classes whose formative properties are heterogeneous. In such cases we might posit a diachronic explanation for the relationships between parts of the word form, but there are also more mysterious cases, such as we find with the tonal and stem alternation classes in San Pedro Tlapepuzco Chinantec are an example. Since there are over 100 tone alternation patterns and well over a dozen stem alternation types, we need to step back from the details in order to make any useful observations. Tonal alternations fall into three broad patterns according to what distinctions in subject person are registered, labelled by Merrifield and Anderson (2007) as A, B, and C. Type C classes have no person distinctions, type B a simple distinction between 3rd person and non-3rd, while type A classes make further distinctions among the non-3rd persons.

| A: 'shave' | | | | B: 'dry' | | | C: 'revive' | | |
|------------|------------------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | PRS | CPL | FUT | PRS | CPL | FUT | PRS | CPL | FUT |
| 1SG | ta ¹ | ta ¹ | ta ¹³ | | | | | | |
| 1PL | ta ² | tá ³ | tá ³ | tsen ³ | tsen ³ | tsen ³ | hiog ² | hiog ² | hiog ¹ |
| 2 | | ta ³ | | | | | | | |
| 3 | ta ¹² | ta ¹ | ta ¹ | | | | | | |

Table 11. Major tone classes in San Pedro Tlapepuzco Chinantec (Merrifield & Anderson 2007)

Stem alternations fall into two broad types. What we can call *simple stem alternations* involve just one feature, either tense-aspect or person, while *compound stem alternations* require reference to both features.

| | simple (person) 'lay' | | | simple (TA) 'release' | | | compound 'pull' | | |
|-----|-----------------------|-------------------|-------------------|-----------------------|-------------------|--------------------|-------------------|--------------------|--------------------|
| | PRS | CPL | FUT | PRS | CPL | FUT | | | |
| 1SG | jioh ³ | jioh ³ | jioh ³ | | | | tón ² | tón ² | tón ³ |
| 1PL | jioh ³ | jioh ³ | jioh ³ | tug ¹² | tug ¹² | tiug ¹² | tion ² | tion ¹³ | tion ¹³ |
| 2 | jioh ³ | jioh ³ | jioh ³ | | | | ton ² | tion ² | tón ³ |
| 3 | jiúh ² | jiúh ² | jiúh ² | | | | tión ² | tión ² | tión ² |

Table 12. Major stem alternation ('palatalization') classes in San Pedro Tlatapuzco Chinantec (Merrifield & Anderson 2007)

Alternating stem verbs constitute a minority of simple verbs (approximately 20%, based on the figures given by Merrifield and Anderson 2007). Within that there is a non-trivial relationship between the tone class type and the stem alternation type:

- Class A verbs nearly always have compound stem alternations (86/96); where they have simple stem alternations, it always involves person
- Class C verbs nearly always have simple stem alternations (22/23).

Why this relationship should exist is mysterious; it is not as if the patterns themselves match between the two systems. Consider the example in Table 13. As a class C verb it shows no person distinctions, only tense-aspect distinctions. And being a class C verb it has a simple stem alternation, but one which distinguishes person, not aspect. Overall, the verb marks both tense-aspect and person –it just never mixes the two within a single segmentable morphological layer.

| | word form 'get' | | | | tone | | | | stem alternation | | |
|-----|---------------------|---------------------|-----|---|------|-----|-----|---|------------------|-----|-------|
| | PRS | CPL | FUT | | PRS | CPL | FUT | | PRS | CPL | FUT |
| 1SG | jniang ² | jniang ¹ | | = | 2 | | 1 | + | jniang | | |
| 1PL | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | jniuh ² | jniuh ¹ | | | | | | | | | jniuh |

Table 13. Non-congruity of 'simple' tone alternations and 'simple' stem alternations in San Pedro Tlatapuzco Chinantec

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