

## ОБЗОРЫ / OVERVIEWS

TONE IN GRAMMAR:  
WHAT WE ALREADY KNOW AND WHAT WE STILL DON'T\*

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In this paper, I provide an overview of tone encoding grammatical meanings, a phenomenon which to date has not been sufficiently studied either by typologists, or by theoretical morphologists. A starting point for the present discussion is the newly published volume “Tone and inflection” edited by Enrique L. Palancar and Jean Léo Léonard, a collection of papers focusing on inflectional tone in various languages, mainly Oto-Manguean. I discuss basic formal and semantic properties of tone in grammar, illustrating my claims with examples from “Tone and inflection” as well as with cases from various African languages. I propose and justify several implicational hypotheses concerning typological patterning of grammatical tones; these generalizations should be tested in a balanced survey in the future.

**Keywords:** derivation, implicational universals, inflection, morphology, morphosyntax, number, person, phonology, tone, typology

ГРАММАТИЧЕСКИЙ ТОН:  
ЧТО УЖЕ ИЗВЕСТНО, И ЧЕГО МЫ ЕЩЕ НЕ ЗНАЕМ?

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В статье обсуждается феномен грамматических тонов, которые до последнего времени почти не рассматривались в теоретической и типологической литературе. Отправной точкой для настоящего обзора послужил недавно вышедший под общей редакцией Э. Л. Паланкара и Ж. Л. Леонара сборник «Тон и словоизменение», посвященный словоизменительным тонам в различных языках, преимущественно ото-мангских. В статье рассматриваются основные формальные и семантические свойства грамматических тонов; в качестве иллюстративного материала приводятся примеры из сборника «Тон и словоизменение», а также из различных африканских языков. Для описания типологического распределения грамматических тонов предлагаются и обосновываются обобщения в виде гипотетических имплицативных утверждений, которые в будущем нужно будет проверить на сбалансированном материале.

**Ключевые слова:** имплицативные универсалии, лицо, морфология, морфосинтаксис, словоизменение, словообразование, типология, тон, фонология, число

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## 1. Introduction

We already know that tonal morphemes can do everything segmental morphemes can do — and even more [Hyman 2011]. However, tone in grammar is still a *terra incognita* for both tonal and grammatical studies. On the one hand, phonologists who study tonal languages usually delve into various aspects of surface rules and the phonetics of tone, paying less attention to the ways tones function in grammar. On the other hand, grammarians seldom consider tone as a means of conveying morphological and morphosyntactic meanings. For example, rather ironically, proponents of Prosodic Morphology [McCarthy 1981; McCarthy, Prince 1990] adopted the formal apparatus of Autosegmental Phonology originally devised for describing tone [Goldsmith 1979] and studied various instances of non-concatenative morphology, e.g. alternations or reduplication, but did not address morphologically assigned tone.<sup>1</sup>

In the history of linguistics, after Pike's prominent study of tone in Mixtec and Mazatec [Pike 1948], it was mainly work on African languages that shaped our understanding of the way tone can function in grammar, e.g. [Welmers 1973: 126—158]. However, studies of grammatical tone remain largely “areal” rather than typological. Until recently, the most extensive work that viewed tonal morphology as an independent domain of morphological theory and typology was a brief paper [Hyman, Leben 2000]; cf. an overview of earlier discussion of suprasegmental morphology therein and in [Hyman 2011].

In their paper, Hyman and Leben present an introduction to tone in morphology. They demonstrate that, like segmental markers, tonal morphology can be realized at word and phrase level, and the analytical problems pertaining to segmental and tonal morphemes are generally the same, e.g. whether to consider tonal or segmental marker a specific “item” or a “process” [Hyman, Leben 2000: 589]. The study [Hyman 2011] largely focuses on phonological properties of tone as opposed to segments, but the author also gives some examples of tone bearing morphological function. What he generally claims is that tone is no different from segmental items. Contrastive segments and segmental strings encode lexical as well as grammatical meanings and, similarly, tone can be used for lexical and grammatical contrasts.

In 2016, a volume “Tone and inflection” edited by Enrique L. Palancar and Jean Léo Léonard, explicitly focusing on inflectional tone, was published. As the editors state in the introduction, grammatical tones are “the orphans of tone studies” (p. 4), since tonologists are much more interested in tonal phonetics and phonotactics than in the ways tones encode grammatical meanings. To redress the balance, contributions to the volume study “possible and sometimes very complex ways in which the melodies of a given language engage in the expression of grammatical meaning” (p. 1).

Indeed, the volume provides lucid illustrations of the trickiest ways grammar can involve tone in various parts of the world. Some contributions clearly demonstrate that typological study of grammatical tone is highly relevant for linguistic theory, because tones may contradict our expectations based on evidence from sole segmental morphology and thus prove to be a test case for grammatical theory.

For example, in Kikuria (Bantu, Benue-Congo), as demonstrated in [Marlo et al. 2015] and discussed by Hyman in the volume (p. 15—39), H tone is assigned to the fourth mora of the verbal stem to mark inceptive and then spreads up to the penultimate mora. In (1)—(5) below, the mora to which H is primarily assigned is underlined for clarity.

KIKURIA (Bantu, Benue-Congo)

(1) *to-ra-[hootoǵér-a]*

1PL-TNS-reassure-FV

‘we are about to reassure’ [Marlo et al. 2015: 253]

<sup>1</sup> Moreover, Prosodic Morphology is sometimes viewed as a framework which reduces apparently non-concatenative inflection to affixal inflection [Lieber 1992: 165] rather than treating non-affixal inflection as an independent phenomenon.

Crucially, when the verb is non-final, mora count continues on the next word:

- (2) *to-ra-[karaaŋg-á] éyétóóke*  
'we are about to fry a banana'
- (3) *to-ra-[sukur-a] éyétóóke*  
'we are about to rub a banana'
- (4) *to-ra-[βun-a] eyétóóke*  
'we are about to break a banana'
- (5) *to-ra-[ry-a] eyetóóke*  
'we are about to eat a banana' [Marlo et al. 2015: 259]

As can be seen in (1)–(5), H is assigned to the fourth mora of the verbal stem **or** to the object noun, if the verbal stem has less than four morae. This is remarkable, given that H tone encodes a specific aspectual meaning (inceptive) and is expected to be a stem-level or a word-level marker. We see that verbal H is calculated at the phrase level in Kikuria, thus violating the basic principle of canonical morphology — namely, that a morphological marker should be phonetically realized within the same word as the lexical stem it modifies [Corbett 2007].

At the same time, “Tone and inflection” has rather severe limitations. First, it is strongly biased towards depicting very intricate systems, e.g. the unruly Haya (Bantu, Benue-Congo; pp. 17, 25–32) or the chaotic Yaitepec Chatino (Zapotecan, Oto-Manguean; pp. 130–133). Most contributions focus on Oto-Manguean languages, which have notoriously complex segmental and tonal morphology. Languages from other parts of the world are underrepresented; they are discussed in four papers out of eleven in total, cf. Hyman on grammatical tone in African languages (pp. 15–39), Jacques on Khaling (Kiranti) (pp. 41–66), Fedden on Mian (Ok) (pp. 67–82), Vydrin on Bamana (Manding, Mande) and Dan-Gweetaa (Southern, Mande) (pp. 83–105). In a way, the collection follows the existing tradition of areal approach to tone studies, this time concentrating on languages of Mesoamerica rather than Africa or Asia.

Though the editors explicitly intend to “identify universal trends” of inflectional tone (p. 2), there are few typological generalizations in the volume. The editors admit that “[a] cross-linguistically representative survey of inflectional tone in the world’s languages remains an ideal goal” (p. 4), and so a neat typology of tonal inflection is left for the future. Two papers — by Hyman and Palancar — take an explicitly typological perspective, but they only show what is attested in tonal languages, saying almost nothing about what is typical and what is not; see section 5.1 for further discussion of Palancar’s paper.

Hence, “Tone and inflection” provides a very detailed survey of what is **possible** for tone in grammar, and that is, well, everything! The nice tonal bestiary collected in the volume leaves the readers thrilled and makes them feel just like 19<sup>th</sup> century typologists fascinated by the diversity of morphological structures in the languages of the world. But our understanding of inflectional tone remains unrestricted. However exciting the borderline cases may be, we still don’t know what is common for grammatical tone and what is peripheral, what is frequent and what is rare. Universals of grammatical tone are yet to be discovered and tested.

In this paper, I provide an overview of tone as a grammatical means in typological perspective, taking the findings of “Tone and inflection” as my starting point. Because a typological study of tone in grammar based on a balanced sample is still a task for the future, this paper is a collection of questions about various aspects of grammatical tone rather than a neat account of answers.

Ideally, a typological study of grammatical tone should have a dual nature. On the one hand, the need for general morphological predictions is to be tested, e.g. that inflectional tones are expected to be formally less complex than lexical ones, cf. a general morphological asymmetry between lexical roots and affixes [McCarthy, Prince 1995; Plungian 2003; Haspelmath, Sims 2010 among many others]. On the other hand, some specific properties of tonal morphemes should be investigated, e.g. how common are polarizing tonal morphemes, as in Haya (Bantu; p. 27).

Here I focus on the first type of phenomena, placing the discussion of tone in the context of general morphological patterns in human languages. I consider various types of asymmetries between lexical, inflectional, and derivational tones and among the existing structural types of tones as grammatical markers, as well as in mapping between tones, segments, and grammatical meanings. I put forward six implicational hypotheses capturing various aspects of grammatical tones. These proposed universals should be tested in a representative and genetically balanced survey in the future. I mainly illustrate my hypotheses with the examples from “Tone and inflection” and from Mande languages, which are my main area of expertise.

Finally, a note on terminology and abbreviations should be made. In what follows, the term “grammatical tone” is used to cover inflectional and derivational tone. It also covers both “morphosyntactic” and “morphological” subtypes of inflectional tone in Palancar’s typology discussed in section 5.1. The symbol “H” stands for high tone, “M” for mid, “L” for low. Word level tones are given in slashes, e.g. /M/. Where tone is marked by figures, 1 and 5 indicate the lowest and the highest tonal levels respectively.

The paper is organized as follows. The relationship between lexical and grammatical tones is discussed in section 2; section 3 focuses on inflectional and derivational tones as the two semantic types of grammatical tones. Section 4 elaborates on additive and replacive tones as the two formal types of grammatical tones. The relationship between inflectional tones, segments, and meaning is discussed in section 5. Section 6 summarizes the results.

## 2. Lexical and inflectional tones

In this section, I focus on the distinction between lexical and inflectional tones, which is of primary importance for the typology of tone. In 2.1 the basic distinction is introduced. In 2.2 our expectations concerning the cross-linguistic distribution of lexical and inflectional tones are summarized. In 2.3 I consider structural asymmetries between lexical and inflectional tones in a given language.

### 2.1. Distinguishing between lexical and inflectional tone

First of all, lexical tones are phonologically unpredictable, i. e. they cannot be calculated on the basis of other aspects of the phonological specification of the lexical stem, nor do they appear in a specific grammatical context. Rather, one and the same lexical tone is consistently linked to various forms of the same lexeme. Inflectional tones, on the other hand, usually characterize a specific form of a given lexeme and are consistently linked to a certain morphosyntactic meaning.<sup>2</sup> For example, in Mwan (Southern, Mande) verbal lexemes bear /H/, /M/ and /L/ lexical tones, but this distinction is neutralized in the imperfective form, where all verbs are marked with replacive /M/ tone [Perekhvalskaya 2006: 305]; see section 4 for the discussion of replacive tones.

Table 1

Tone in some Mwan (Southern, Mande) verbs

Lexical	Imperfective
/H/ <i>kú</i> ‘grasp’	/M/ <i>kū</i>
/M/ <i>gǔ</i> ‘sell’	/M/ <i>gǔ</i>
/L/ <i>gb̃</i> ‘catch’	/M/ <i>gb̃</i>

<sup>2</sup> This definition covers the so called “morphosyntactic tone”, a term used by Palancar in his contribution, which I assume to be a prototypical example of inflectional tone. However, tones alternating in inflectional paradigms may also be unpredictable and inconsistent across lexemes and the forms of a given lexeme. Such tonal markers are sometimes referred to as “morphological”, as opposed to lexical or morphosyntactic; see section 5.

A prototypical inflectional tone should (a) be directly linked to a lexical stem rather than to a function word or an affix and (b) encode a meaning which is grammatical rather than lexical (for this type of content words). A deviating case is worth mentioning.<sup>3</sup> One possibly controversial phenomenon is the tone that differentiates meanings of function words. Such tones may be linked to abstract meanings, but at the same time they may surface on function morphemes rather than lexical stems, which makes them diverge from the prototypical case.

In his morphological typology of inflectional tone, Palancar (pp. 112–113) discusses tone as a lexical property of grammatical markers (function words or affixal morphemes). He notes that “[i]n many tone languages with relatively complex inflectional morphology, tone may be simply a property of the lexical phonology of the inflectional affixes, just as it is associated with the phonology of other words with lexical content”. I will illustrate his point with an example from Aghem (Grassfields, Benue-Congo), where three prepositions contrast only in tone: *á* (locative, instrumental), *â* (recipient, benefactive), *à* (comitative).

AGHEM (Grassfields, Benue-Congo)

- (6) *á* *ndúghó*  
 LOC house  
 ‘in the house’

- (7) *â* *bvɛ́* *tɔ́*  
 RECIP dogs DET  
 ‘to the dogs’

- (8) *à* *bvɛ́* *tɔ́*  
 COM dogs DET  
 ‘with the dogs’ [Hyman 2010: 107]

It may be argued that in (6)–(8) H, HL, and L linked to the prepositions (a) are lexical, i.e. idiosyncratic properties of each preposition, or (b) are inflectional, i.e. encoding locative, recipient, and comitative meanings respectively. Because there is no regular pattern, e.g. L marking comitative on other parts of speech, lexical interpretation is preferable. Still, such cases are important, because function morphemes consisting of both segments and tones are a common source of inflectional tones, once segmental markers are lost; see 2.2 and 4.1. On the other hand, they are peripheral for a synchronic typology of inflectional tone, as long as segmental material is still present.

## 2.2. Cross-linguistic distribution of lexical and inflectional tones

Once we have defined lexical and inflectional tones and taken into account some problematic cases in 2.1, it is now possible to focus on the cross-linguistic distribution of lexical and grammatical tones. The following implicational hypothesis is suggested:

### Hypothesis 1:

If a given language has inflectional tones, it also has lexical tones.

Languages with tone encoding lexical but not inflectional meanings are characteristic of South-east Asia. The reverse pattern, i.e. a language with exclusively inflectional tone, is not unknown either, e.g. Chimwiini (Bantu, Benue-Congo) as discussed by Hyman (p. 34). We can expect that the two types may be unequally distributed typologically, the former being more common than the latter, even with areal and genetic biases eliminated.

There are at least two possible sources of inflectional tones. First, as the contributors of “Tone and inflection” show in numerous cases (see papers by Vydrin, p. 92, Feist and Palancar, p. 292),

<sup>3</sup> Lexical tones are not unproblematic either, e.g. there is a problem of choice between tonal vs. accentual analysis in languages with highly restricted prosodic systems, see [Hyman 2009]; this controversy is commonly discussed in tone literature, so I put it aside.

inflectional tones tend to originate from morphemes with both segmental and tonal exponents, once segments are lost and tone is preserved, e.g. article \*-ò > suffix -L in Bamana (Manding, Mande). This means that such languages must employ tone for at least some function words or morphemes. Given that function words originate from content words, the latter must have lexical tone as well. Under this scenario, the emergence of inflectional tone implies that tone is — or was at some point — also employed for lexical roots. A language with exclusively inflectional tone is then possible if lexical tone was lost at some point.

Second, tone, be it lexical or inflectional, may appear *de novo* after the rephonologization of laryngeal articulation, e.g. “directly” from segmental /h/ or glottal stop [Kingston 2011; Hyman 2013]. Thus, a laryngeal affix may be transformed into a tonal marker in a language with no lexical tone whatsoever. However, tonal phonologization tends to be systematic, so it is likely to affect most — if not all — morphological exponents with relevant phonological properties. A purely inflectional tone is then expected in a language with segmental and/or positional asymmetries between roots and affixes, e.g. only affixal morphemes having prepausal /h/, which seems rather unlikely if not impossible.

The diachronic scenarios outlined above suggest that languages with tone encoding exclusively inflectional but not lexical meanings are possible, though the probability of such systems to appear is restricted to some very specific circumstances, e.g. when lexical tones have been lost for whatever reason. Hypothesis 1 is then expected to hold statistically rather than universally.

### 2.3. Formal properties of lexical and inflectional tones

Here I discuss formal properties of lexical and inflectional tones in languages where tone participates in both lexical and inflectional contrasts.

#### **Hypothesis 2:**

Inflectional tones should not be formally more complex than lexical tones.

Generally, root morphemes tend to have more complex phonological structure than affixal morphemes, e.g. the former are longer than the latter [Plungian 2003: 81; Haspelmath, Sims 2010: 19], hence we may expect that a similar difference exists between lexical and inflectional tones. Two more concrete hypotheses pertaining to paradigmatic and syntagmatic properties of tone can be tested:

#### **Hypothesis 2a (paradigmatic):**

In a given language, there should not be more level contrasts for inflectional tones than for lexical tones.

#### **Hypothesis 2b (syntagmatic):**

In a given language, sequences of tones encoding inflectional meanings should not be more complex than sequences encoding lexical meanings.<sup>4</sup>

It follows from Hypothesis 2a that we do not expect to find a three-way tonal contrast for grammatical tones, if there is just a binary distinction in lexical tones. Mande languages, having various types of lexical contrasts, provide a nice illustration of this hypothesis. Thus, in Mende (Southwestern, Mande), there is binary lexical H vs. L contrast, and there is replacive /L/ tonal morpheme marking possessed nouns and verbs in some TAM constructions [Innes 1971]. In Vai (Vai-Kono, Mande), there is also a binary lexical contrast, but both H and L function as grammatical tones marking the rightmost stem in compounds [Welmers 1976]. We do not expect to find

<sup>4</sup> I ignore here the difference between phonologically simplex non-segmentable tonal contours, e.g. of Oto-Manguean type, and contours functioning as sequences of level tones of African type, covering both cases by Hypothesis 2b.



grammatical M tone in languages with lexical binary contrast, like Mende and Vai. At the same time, Mwan (Southern, Mande) does have replacive /M/ tone marking verbs in imperfective construction as shown in Table 1, but there is also a three-way distinction for lexical tones in Mwan [Perekhvalskaya 2006]. Hence, all the three languages adhere to Hypothesis 2a.<sup>5</sup>

Hypothesis 2b captures the idea that the linear structure of grammatical tonal morphemes is expected to be generally simpler than that of lexical tonal patterns. For example, in Guinean Kpelle (Southwestern, Mande), there are five major word-level tonal melodies: /H/, /LH/, /LHL/, /HL/, /L/. All of these melodies can be lexical, but only /LH/ and /L/ function as grammatical replacive markers as well [Konoshenko 2014b]. Similarly, we do not expect to find /LHL/ grammatical tone in a language with only /H/ and /LH/ lexical patterns.

It should be noted that it is quite common for lexical and grammatical tones to function differently in various subsystems of a given language. For example, in many Bantu languages tone is lexical for nouns and inflectional for verbs [Odden 1989; Marlo 2013; Marlo, Odden (to appear)], e.g. in Kikuria discussed in section 1. Another example comes from a New Guinean language Iau (Lakes Plain), where an inventory of eight tonal melodies behave as lexical in nouns, but as inflectional in verbs [Bateman 1990]. Still, we do not expect (verbal) inflectional tones to be paradigmatically and syntagmatically more complex than (nominal) lexical tones in such languages. Both Kikuria and Iau data do not contradict Hypotheses 2a and 2b.

Another common complication arises in cases when grammatically assigned melodies are different from lexical ones. For example, in Tommo So (Dogon), nouns have lexical /LH/, /H/, and /HL/ melodies replaced by grammatical /L/ in certain syntactic environments, e.g. before adjectives [McPherson 2014: 6]. However, Hypothesis 2a holds here, because the “independent” grammatical /L/ melody does not add new level contrasts, the H and L tonal elements being part of lexical melodies as well. Hypothesis 2b is also corroborated, since /L/ is a level melody as opposed to lexical /LH/ and /HL/ contours, so it is syntagmatically simpler.<sup>6</sup>

### 3. Inflectional and derivational tones

The distinction between inflection and derivation is a notorious issue in morphology, which is relevant for tonal morphemes no less than for segmental ones (but see [Spencer 2013] arguing against the general validity of this distinction). Nevertheless, I will not elaborate on this problem here, as I know of no evidence particularly relevant for differentiating between inflectional and derivational tone.

In section 3.1, I question if there may be any implicational relationship between inflectional and derivational use of tone in a given language and conclude that we don't expect any such correlation. In 3.2 the formal patterning of inflectional and derivational tones in morphological structure is considered.

<sup>5</sup> There is, however, some evidence contradicting Hypothesis 2a. For example, in Fe'fe'-Bamileke (Grassfields, Benue-Congo), there is a L/M/H contrast, but H tones only result from grammatical processes, i.e. they are never lexical [Hyman 1972; p.c.]. The question is how common such systems are and whether they are genetically and/or areally biased, and I leave it for the future.

<sup>6</sup> As pointed out by an anonymous reviewer, inflectional tones are expected to be simpler than lexical ones only if the former develop in a replacive or additive manner, i.e. if they either completely replace lexical tone or are additively combined with it, see also section 4.1. However, in some languages, e.g. in Shilluk (Nilotic), a process of fusion between lexical and grammatical tones must have operated, resulting in the complication of the tonal inventory. Thus, in Shilluk there is a three-way L/M/H level contrast as well as four falling contours — Low Fall, High Fall, Late Fall, and High Fall to Mid. The last two contours are only found in specific grammatical forms [Remijsen, Ayoker 2014; Remijsen 2016]. Similarly to the case of Fe'fe'-Bamileke (footnote 5), the question here is whether tonal compression is common enough to question the general validity of Hypotheses 2a and 2b. I expect the answer to be negative, but this has to be checked in the future.

### 3.1. Cross-linguistic distribution of inflectional and derivational tones

As I write in the introduction, inflectional tone is underrepresented in the typologists' agenda, but the situation is even worse for derivational tone and, indeed, for derivation in general as opposed to inflection [Lieber, Štekauer 2009]. Note that "Tone and inflection" specifically focuses on inflectional tone rather than on both types of grammatical tones. The typology of tonal derivation and its relationship with inflectional tone is yet another topic to pursue in the future.

The first question one is likely to address when studying derivational and inflectional tones is their distribution in a given language. Recall Greenberg's Universal 29: "If a language has inflection, it always has derivation" [Greenberg 1963: 93]. Does this hold for exclusively suprasegmental morphemes? For example, we know that there was tonal derivation but apparently no inflection in Classical Chinese [Downer 1959]. Or take the Mande family, where there seem to be languages with both inflectional and derivational tone, e.g. Guinean Kpelle (Southwestern), or just inflectional tone and no tonal derivation, e.g. Guinean Looma (Southwestern; Daria Mishchenko, p.c.). No systematic study has been carried out so far to establish the distribution of language types. A priori, there should be no reason for any correlation, because tonal morphemes evolve independently from inflectional and derivational segmental morphemes, hence a language which has developed inflectional but not derivational tone is not unexpected.

### 3.2. Inflectional and derivational tones in morphological structure

#### Hypothesis 3:

When both inflectional and derivational tones apply to the same word root, inflectional tones may override derivational tones, but not vice versa.

This subsection concerns the interaction of inflectional and derivational tone in morphological structure. For example, as Hyman (pp. 20—22) shows, despite some superficial differences, in both Dinka (Nilotic) and Hausa (Chadic) "inflectional tone overrides derivational tone which in turn overrides base tone". In Dinka, the derivation of the form *wēc* 'kick it hither' from the stem /wêc/ 'kick' proceeds as shown below [Andersen 1992—1994]:

#### (9) DINKA (Nilotic)

lexical /HL/ *wêc* → derivational /L/ *wēc* → inflectional /H/ *wēc*

In (9), the root /wêc/ with lexical /HL/ gets breathiness, long vowel, and /L/ under centripetal derivation, which is in turn replaced by /H/ marking 2SG subject of the imperative.

Interestingly, in Shilluk (Nilotic), which is closely related to Dinka, lexical and derivational layers remain distinct [Remijsen 2016]. Crucially, we do not expect to find a language where derivational tones suppress inflectional ones.

The dominance of inflectional over derivational tone is likely to be universal. It nicely parallels Bybee's Relevance Hierarchy devised for segmental marking: grammatical meanings which are more relevant to lexical meaning are encoded closer to the stem [Bybee 1985], cf. also Greenberg's Universal 28: "If both the derivation and inflection follow the root, or they both precede the root, the derivation is always between the root and the inflection" [Greenberg 1963: 93]; this generalization proved to be typologically very robust [Lieber, Štekauer 2009]. The only difference between segmental and tonal morphemes is that the former are arranged horizontally, whereas the latter are better modelled as vertically organized — hence Hyman's wording that "uppermost" morphological marking wins (p. 22).

## 4. The structure of grammatical tones

In this section, I discuss formal types of tonal morphemes, which are characteristic of both inflectional and derivational tones. In 4.1 the two basic types of tonal morphemes are introduced,



and their diachronic properties are highlighted. In 4.2 I consider the potentially asymmetric typological distribution of suffixal and prefixal tones.

#### 4.1. Replacive and additive tones

There are two formal types of tonal morphemes — **replacive** [Welmers 1973: 132—133; McPherson 2014], see Feist and Palancar as well (p. 281), also labelled **suppletive** by Palancar (p. 115) or **melodic** in [Jenks, Rose 2015], and **additive**.

Replacive tone overwrites lexical tone either completely, i.e. it fully deletes lexical tone, see Table 1 from Mwan and (9) from Dinka, or partially, e.g. only deleting lexical tone on the first mora of the stem. For example, in Yoloxóchitl Mixtec (Mixtecan, Oto-Manguean), rising /14/ tone replaces the lexical tone on the first mora of the verb in negative irrealis: *choʔ<sup>3</sup>ma<sup>4</sup> → cho<sup>14</sup>ma<sup>4</sup>* ‘squash’ (pp. 319—320). Additive tone is added to lexical tone either preceding or following it, cf. L tonal suffix marking nominal referentiality in Bamana (Manding, Mande; pp. 89—92).

Additive tones can usually be traced back to segmental markers rather easily, e.g. high toned diminutive suffix *-i > -H* in Cantonese [Hyman, Leben 2000: 589], referential article *\*-ò > -L* in Bamana (p. 92). The origin of replacive tones is usually more blurred, unless they are argued to originate from additive tones and ultimately from segmental markers, e.g. neutral aspect marker in Dan Gwætaa (Southern, Mande; p. 98) or aspectual markers in Cuicatec (Mixtecan, Oto-Manguean; p. 292).

#### 4.2. Prefixal and suffixal tones

##### Hypothesis 4:

Additive tones are prefixal or suffixal.

This generalization was stated by Hyman and Leben: “there is apparently no known case of a tonal infix, say a L tone, which interrupts the lexical tones of the base to which it is attached. There also are no clear cases of tonal transfixes” [Hyman, Leben 2000: 590]. Hence, additive tones may only be either prefixal or suffixal.

##### Hypothesis 5:

Suffixal tones are more common than prefixal ones.

Segmental suffixal markers are more common than prefixal ones, e.g. Greenberg’s generalization, “[a]s between prefixing and suffixing, there is a general predominance of suffixing” [Greenberg 1963: 92]; see also [Himmelman 2014] for an up-to-date discussion of suffixing preference. Because tonal morphemes originate from segmental morphemes, we may expect that a similar distributional asymmetry may hold for additive tones.

### 5. Tones, segments and meaning

In section 5.1, I focus on the recurrent patterns of mapping between tone and meaning as suggested in Palancar’s morphological typology of tonal markers. Semantic asymmetries between tonal and segmental morphemes are introduced in 5.2.

#### 5.1. Morphosyntactic and morphological tone

In Palancar’s contribution to “Tone and inflection”, a typology of mapping between tone and inflection is provided from a morphological perspective in the sense of [Aronoff 1994]; see also [Corbett 2012] for a similar distinction between morphological and morphosyntactic features. Palancar discusses three basic types of tone, which I summarize as follows:

- (a) LEXICAL tone is linked to a given lexical stem or a segmental grammatical marker. For each lexeme, there is a specific tone, which is phonologically unpredictable but consistently appearing on its forms encoding different meanings;
- (b) MORPHOSYNTACTIC tone is posited when there is a consistent mapping between tone and a specific grammatical meaning. For all lexemes, a form carrying a specific meaning must be marked by a specific tone, which is interpreted as being directly linked to this meaning, cf. imperfective tone in Mwan (Table 1);
- (c) MORPHOLOGICAL tone is postulated when there is no consistent mapping between tone and meaning. Various lexemes and, crucially, forms of those lexemes pattern differently in their tonal behavior, to the point that it is not possible to link their tone to a specific grammatical or lexical meaning.<sup>7</sup>

I will illustrate morphological tone with just one example from Palancar's paper (with simplifications, as I put aside stem alternations). Consider the paradigms of six verbs from Chichimec (Oto-Pamean, Oto-Manguen). For each verb, its stem tone is given in three TAM forms (present, future and potential) for 1SG and 2SG values.

Table 2

## Verbal inflection in Chichimec

TAM	P/N	<i>pór</i> 'remove'	<i>ɔ̀r</i> 'appear'	<i>sá</i> 'win'	<i>ʔi</i> 'want'	<i>mé</i> 'defend'	<i>tsà</i> 'hurt'
Present	1SG	H	L	H	L	H	L
	2SG	H	L	L	L	H	L
Future	1SG	H	L	H	L	H	H
	2SG	H	L	L	H	L	L
Potential	1SG	H	L	H	H	L	L
	2SG	H	L	L	H	L	L

The tones of all the six verbs in Table 2 cannot be inferred from segmental structure. The tones of *pór* 'remove' and *ɔ̀r* 'appear' are consistent throughout the paradigm, hence they are interpreted as lexical for these verbs. The verb *sá* 'win' gets L in 2SG regardless of its TAM meaning, but this does not hold for the other three verbs with variable tone. The verb *ʔi* 'want' gets H in the potential form. The last two verbs *mé* 'defend' and *tsà* 'hurt' both get L in the potential form, but the tones in their present form are again different. Hence, for the four verbs with variable tone, there is no way to link any specific tone to any specific morphosyntactic meaning. The only recurrent pattern here is that their 1SG and 2SG forms should have different tones in the future.

In his paper, Palancar further distinguishes between various subtypes of morphological tone depending on the predictability of tone and segment patterning in the same paradigm. Unfortunately,

<sup>7</sup> Although Palancar does not elaborate on this, one may wonder how these types relate to each other in theory and in reality. A common case is morphosyntactic tone marking a specific meaning combined with lexical tone elsewhere. The other two pairs are more problematic. One can think of morphological tone irregularly marking a set of paradigmatic cells with lexical tone appearing elsewhere. However, in a language where all or most tone marking is unpredictable, there will be no reasonable distinction between lexical, i.e. default, and morphological tone. The coexistence of morphosyntactic and morphological tone in the same language is also rather controversial. For example, in Kabiye (Gur, Atlantic-Congo) imperfective present and aorist are consistently marked by high tone, but the distribution of H and L is weakly predictable for other verbal meanings (pp. 117–120). Palancar notes that we could posit morphosyntactic high tone linked to imperfective present and aorist in Kabiye, but this does not explain why it also appears in other cells of the paradigm. Although a split interpretation with both morphosyntactic and morphological tones is possible, the author contends that tone in Kabiye is generally morphological. Accordingly, the answer to the question whether all the three types can coexist in the same language depends on how we treat cases like Kabiye.

he does not make any statements about the diachronic relationship between the proposed types and their areal distribution, not even within the Oto-Manguean family, which is the author's main focus. It seems that very complex systems with lexical idiosyncrasies in tonal inflection of the Chichimec type may be a genetic property of the Oto-Manguean family, since they are not commonly attested in other parts of the world. Still, to my knowledge, verbal inflection with moderately complex tonal classes is also typical of Southern Mande, Kwa, and Kru families in West Africa.

## 5.2. Semantics of tonal and segmental morphemes

In this subsection, I compare tonal and segmental markers occurring in the same paradigm.

### Hypothesis 6:

Within a given paradigm with both tonal and segmental marking, typologically less marked features are encoded by tone.

The notion “typological markedness” refers to asymmetric relationships between two or more values of the same conceptual feature, e.g. singular and plural values of the number category [Croft 2003]. Less marked elements tend to be coded by zero or shorter morphemes, they have less syncretism in coding other categories than more marked elements do, e.g. English *he*, *she*, *it* vs. *they* with gender distinctions neutralized in the plural as opposed to singular pronouns [Croft 2003: 87 ff.].

To illustrate how tonal morphology may be related to markedness asymmetries, I will focus on person-number paradigms, more specifically on the asymmetry between singular and plural person markers. Cross-linguistically, singular markers show much less syncretism of person values, i.e. when the three person values (‘speaker’, ‘addressee’, and ‘other’) are marked by less than three different morphemes, cf. 9.5% languages with syncretism in the singular against 20.8% with syncretic plural marking [Cysouw 2009]. Singular forms are also much more textually frequent.<sup>8</sup> Hence, it may be argued that singular forms are less marked than plural forms.

A recurrent pattern can be traced throughout “Tone and inflection”. When there is tonal marking of person, it is always in the singular. In Chimwiini (Bantu, Benue-Congo), subject person is encoded by verbal prefixes, but in the present and past tenses 2SG and 3SG subjects are differentiated by tone only (p. 34). In Zenzontepec Chatino (Zapotecan, Oto-Manguean), pronouns for all person-number categories are enclitics except for 2SG, which is realized by tone change on the basic stem (pp. 150—162). In Yoloxóchitl Mixtec (Mixtecan, Oto-Manguean), 1<sup>st</sup> person has four phonologically conditioned allomorphs, one of them is purely tonal (p. 312). In Amuzgo (Eastern, Oto-Manguean), all person values are marked by tone (2PL and 3PL are zero marked, as their tone is arguably lexical), but plural inflectional tones are much more regular and predictable than the singular ones (pp. 213—214). I can add another example to this collection — in all Southwestern Mande languages, there is a paradigm of person markers, where 1SG and 3SG meanings are marked by initial consonant alternation and a tonal prefix, cf. [Welmers 1973: 128—132].

I myself know of no language with tone marking person-number values in plural but not in singular. A typologically balanced survey will show whether this gap is accidental. For now, we can formulate a minor hypothesis for person marking:

### Hypothesis 6a:

In a given language, if at least some plural person-number values are marked by tone, (at least some) singular person forms are also marked by tone.

If this asymmetry proves valid, the diachronic explanation behind it would be relatively straightforward. Singular person markers are more frequent, they tend to have less phonological material and are likely to undergo formal erosion faster than plural markers. One of the possible

<sup>8</sup> For example, in spoken corpora of both American English and Russian, singular person markers are more than twice as frequent as plural ones (data from [COCA; RNC], accessed on November 12<sup>th</sup>, 2016).

outcomes of such erosion would be the loss of segments, whereby morphological markers could become only tonal.

## 6. Conclusion

Above I provided an up-to-date overview of tone in grammar. Benefiting from the discussion in the newly published volume “Tone and inflection”, I addressed the essential distinctions relevant to tone in grammar, i. e. the distinctions between lexical and grammatical tone, inflectional and derivational tone, additive and replative tone, morphosyntactic and morphological tone. I then suggested that members of these pairs may show asymmetric properties in their typological patterning and formulated 6 implicational hypotheses, which should be tested in a balanced survey in the future.

As I have already said, the typology of tone in grammar should cover two aspects. On the one hand, general morphological predictions should be verified, and I have generally focused on this type of inquiries in my overview. On the other hand, some very specific properties of tone are to be investigated. For space limits, this topic is not covered in this paper, but many questions could in principle be put into our research agenda. How common are specific tones that only function as grammatical markers but do not participate in lexical contrasts, as H in Fe’Fe’ mentioned in footnote 5? How common are scalar tone shifts as discussed in [Fedotov 2016] for Gban (Southern, Mande) and in [Sande 2016] for Guébie (Kru)? Is there any relationship between the number of lexical contrasts and the preference of a language to have inflectional tones? For example, as shown in [Konoshenko 2014a] for Mande, languages with more complex contrasts have more tonal morphemes. The list of specific questions can be easily continued.

## ABBREVIATIONS

1, 2, 3 — 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>d</sup> person	L — low	RECIP — recipient
COM — comitative	LOC — locative	TAM — tense, aspect, mood
DET — determiner	M — mid	TNS — tense
FV — final vowel	NEG — negative	
H — high	IRR — irrealis	

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