6. The Languages of Middle America

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1. Introduction[1]

In this chapter, we present a survey of word prosodic systems in the languages of Middle America (Campbell 1997: Chapter 5). Middle America includes Central America *and* Mexico. The term 'Middle America', referring to a geographical unit, is not synonymous to 'Mesoamerica,' which refers to a culture area "defined on the basis of common characteristics that were present during the conquest times" (Suárez 1983: 11). Bearing this difference in mind, we here offer a survey of the families and isolate languages that Suárez groups within the Mesoamerican group and that Campbell (1997) considers in his chapter on 'Middle American' languages; this does not include the 'West Indies' (Antilles, Bahamas, Turks and Caico islands) or Cuba.

2. The language families

Some language families fall almost completely within the Middle American region, while others only have a few representatives. To the former group belong:

(1) – Oto-Manguean (section 5.1.)
– Mixe-Zoquean (section 5.2.)
– Totonacan (section 5.3.)
– Tequistlatecan (section 5.4.)
– Mayan (section 5.5.)
– Misumalpan (section 5.6.)

1. During the writing of this chapter we have received useful input from various people, including Lyle Campbell, Esther Herrera, Diane Hintz, Jean-Léo Léonard, Inga McKendry, Irina Monich, Keith Snider, and Rebecca Yarrish.

We adopt here a generally accepted classification; see Suárez (1983) and Campbell (1997) for detailed discussion as well as motivation and proposals for alternatives, involving some so-called macro-families. There also are a number of *isolates* in this region, among which the following are the better-known ones (see section 5.7.):

(2) Extant isolates: Jicaque (Tol), Seri, Huave, Tarascan, Xincan
Extinct isolates: Cuitlatec, Naolan, Maratiton, Guaicurian (a family), Alagïlac

We will also include some languages spoken in this region that belong to language families that have most of their representatives *outside* Middle America, such as (to the north) the Aztecan languages of the Uto-Aztecan group (section 5.8.) and (to the south) some members of the Chibchan family (section 5.9.).

3. Our sources

The present survey is based on a variety of sources. StressTyp contains information on only 15 Middle American languages. We complement this material with additional information from the literature on Middle American languages. Needless to say, we have been unable to consult all the sources. We hope that the present survey will encourage researchers to bring additional work to our attention so that, eventually, the information presented here and much additional information can be added to the StressTyp database.

4. Types of systems

Like in many other parts of the world, the word prosodic systems of languages in this area fall in two broad categories. Many languages use pitch properties at the word level; cf. Weidert (1981), Suárez (1983), Yip (2002) and numerous studies by Kenneth Pike and his collaborators. These languages can roughly be grouped in two further categories. In a first category, pitch is used *distinctively*, with all or specific syllables having one of a set of distinctive tones (level tones such as H, L, M and, sometimes, contour tones). Such languages can be 'fully tonal', with tonal contrast on every syllable, or display characteristics of 'restricted tone languages' in that tone contrast occurs on only few syllable, sometimes only one in the word (Voorhoeve 1973). In the latter case, it is often sug-

gested that the syllable that attracts tonal contrast is accented, the accent being merely an anchor for tones or, in addition, showing other cues such as 'stress' (duration, intensity). Instead of this dependency of tone on accent, other tonal systems may display a dependency that goes in the other direction such that a notion of accent or stress is said to be dependent on the tonal structure of the word. Naturally, if a system is both tonal and has stress or accent, the two may be independent from each other (cf. Hyman 1977, 2006, van der Hulst, this volume; Wetzels and Meira, this volume).

A second group contains languages that do not have distinctive tones, but rather choose pitch as the exclusive or dominant cue for 'prominence'. Languages of this type are often called 'pitch-accent' languages (or non-stress accent languages; Beckman 1986), as opposed to stress-accent languages where the notion 'stress' is taken to refer to a *set* of phonetic cues within which pitch is *not* the only player. As pointed out in Wetzels and Meira (this volume) in stress-accent languages, pitch rather than duration may be a more important cue (possibly combined with a third common cue, 'intensity') when the language has contrastive vowel length, whereas duration may be a preferred cue in stress-accent languages that have distinctive tones. We thus end up with the following typology of word prosodic systems:

(3) a. Tonal languages
    i. no accent
    ii. accent present but not related to tone
    iii. accent present and in a relationship with tone:
        a. tone location dependent on accent ("*tonal accent language*")
        b. accent location dependent on tone

b. Non-tonal languages
    i. no accent
        a. with stress
        b. without stress
    ii. accent
        a. with 'stress' as cue: "*stress-accent language*"
        b. with pitch as cue: "*pitch-accent language*"[2]
        c. with duration as cue: "*duration-accent language*"
        d. with ....

2. We always have to be aware of different uses of terminology, and of course different ways of analyzing any given system. Dol and van Zanten (this volume)

We will use the term 'accent' for a lexical mark (predicable or unpredictable) of syllables that are somehow 'special', and 'stress' for a metrical structure and its associated phonetic cues. As shown in (3) non-tonal, non-accentual languages may have stress or no stress (see van der Hulst, this volume; to appear) for full discussion. In this chapter, we mainly deal with languages in the categories (3a) and (3bii). In the remainder of this section, we first discuss examples of languages that combine accent, stress and tone in various ways. The material in this section is largely drawn from Suárez (1983) and Yip (2002). In section 5, we present languages representative of the various language families in this area, drawing on a wider range of resources.

4.1. Tonal aspects

Suárez (1983) classifies the tone systems of languages of this area in terms of various criteria. Some systems have levels (such as high, mid and low), which occur *as such* (making up what others call 'level tones') or in combinations (making up what others call contour tones). He calls such systems 'register systems,' of which Tlapanec is mentioned as an example (see section 5.1.6.). In other languages, which may also have level tones, the contour tones can, apparently, not be defined as transitions between independently needed level tones, so that in these cases the contours are 'primitives'; these kinds of systems he calls 'contour systems'. Examples he mentions are Texmelucan Zapotec (with three contours and one low level tone) and Copola Trique (which has three level tones and five contours, some of which can be analyzed as sequences of level tones while others cannot). Clearly, the existence of 'primitive' contour tones is a crucial element in this typology. For a different point of view, see Yip (2002: 47–52), who proposes that perhaps all contours can be represented as sequences of level tones. Both Suárez (1983: 50–51) and Yip (2002: 217–219) remark that various languages in the area have a 'terrace system,' meaning that they have downstep or upstep.

Other dimensions of difference between languages of this area involve (a) the number of tones (paradigmatic contrast), (b) possible combinations

require that the syllable claimed to be accented is perceived as 'prominent' on independent grounds. Downing (this volume) on the other hand uses the term pitch accent system to include all systems in which accent and tone interact. See van der Hulst (to appear) for a general discussion of the notion pitch-accent.

in contour tones, (c) syntagmatic restrictions on tone sequences, (d) the presence of tone perturbation or tone sandhi, (e) the grammatical use of tone (tonal morphemes, tones as markers for morphological classes) and (f) the relation between tone and stress.

a. Tone numbers range from two (H, L) to perhaps five in register systems (mentioned are Usila Chinantec and Chicahuaxtla Trique, both of which also have various combinations, or contours). More common are four tone systems (Popolocan group, Lealao Chinantec, Yaitepec Chatino, Mixtec from San Antonio Atatlauhca), while three-tone systems are the most common (Zapotecan, Chinantecan, Miztecan, Popolocan, Tlapanec and Amuzgo). There are also many two-tone languages with contour tones (Otopamean languages: North and South Pame, Mezquital Otomi, Isthmus and Mitlazapotec). Two-tone systems without contours in this group are Matlatzinca and Chichimec. Outside the Otopamean languages, two-tone systems without contours are the only type and present in Huichol, Huave of San Mateco, Tzotzil of San Bartolo and Uspantec.

Yip (2002: 214–5), based on Hollenbach (1977), takes a close look at two dialects of Trique, with five levels and various combinations, discussing the challenges that these systems pose for systems of tone and register features. She refers to San Juan Copola Trique, where the distribution of the tonal contrasts is such that many non-final syllables have no distinctive tone, whereas final syllables display an eight-way surface contrast (six-way if the vowel is short). San Andrés Chicahuastla Trique has a fifteen-way contrast on final syllables (nine binary contours and two ternary contours), with a more limited contrast on the penult (four-way, all level) and antepenult (three-way, all level). Restrictions of this sort will be discussed further below.

b. In some language combinations of tones into contours are free (as in Tlapanec, which also has a three-tone combination), while in others only certain combinations occur. Sometimes (as in Mixtec of San Miguel el Grande) combinations can only occur in long vowels. Yip (2002: 216–7) notes that surface contours can be the result of underlying contour tones, from the association of floating tones (with a morphological function) to syllables that bear tone, or from tone spreading rules.

c. Suárez (p. 51) remarks that in two-tone systems it is rare to find forms that are differentiated by tone only. This perhaps is an indication that such systems are on their way to using high tone/pitch as an accentual cue. This

issue is related to the question of whether, in a two-tone system, both tones have equal status or not. In many cases it might seem as if the high tone must be lexically marked, with the low tone regarded as a default (literally 'unmarked') tone; see Yip (2002: 219–222) for discussion and the discussion of Huave below (where L rather than H is the lexically marked tone). Many syntagmatic restrictions are caused by the interaction between tone and accent or stress such that the tonal contrast is richer on or even restricted to accented syllables. Finally, syntagmatic restrictions may result from tonal assimilation.

d. Some languages have tonal perturbation effects, with tonal patterns affected when a word is in a larger context. For instance, Huave, Northern Tepehuan, and Mixtec and Zapotecan languages show extensive tone perturbation effects, while the Chinantec languages, Tlapanec, and Yucatec do not. Interestingly, while Soyaltepec Mazatec has tonal rules, the closely related language Huautla Mazatec does not. Tonal perturbation effects may be progressive or regressive, and participation may depend on morphological or phonotactic and syntactic characteristics of the words that are affected or that trigger the pertubations. Yip (2002: 224 ff.) shows that the languages in this area display the 'usual autosegmental effects,' which involve tone stability (tones staying behind after their underlying tone bearers have been deleted, which then may condition other tonal processes or dock on neighbouring tone bearers, sometimes creating additional contours), tonal spreading and lexical floating tones that condition processes of downstep and, finally, tonal affixes (factor (e) mentioned above).

4.2. Tone – accent interactions

So far we have largely considered tone by itself, even though in some of the examples mentioned some form of accent or stress is present, either independent from the tonal system, or not. In terms of tone/accent dependency we distinguished two cases that we now discuss in more detail, taking examples from Suárez (1983) and Yip (2002), who both discuss the relationships between tone and accent/stress, and from the survey in section 5.

4.2.1. Tone dependent on accent

Where tone is dependent on accent, Suárez refers to this as an accented syllable forming the *domain* of tone. We already mentioned the example

(discussed in Yip 2002, and Hollenbach 1977) of San Juan Copola Trique, which displays 'shrinking' tone inventories outside the final syllable. The final syllable is not described as being stressed just because it carries the tonal contrast; final syllables are richer in many phonotactic respects, with a more complex syllable structure and a greater number of segmental contrasts in consonants and vowels. We here mention some other examples from Suárez (1983) and Yip (2002). Isthmus Zapotec (Mock 1985, 1988) has two tones, which associate to the stressed syllable and from there spread rightward. Pre-stress syllables are low-toned. Stress is root-initial (although according to Yip weight may play a role). Suárez mentions Northern Pame and Yaitepec Chatino as languages that have a tonal contrast only in the syllable that is said to be stressed (the last syllable in both cases, presumably of the stem). This can be compared to Huautla Mazatec where every syllable can have contrastive tone, with final stress. Between these extremes, we find cases where the contrast on certain non-accented syllables is limited. In Palantla Chinantec, for example, there is no tonal contrast on a post-stress syllable.

In cases of this type, the dependency of tone on accent is such that the tonal lexical contrast is limited in terms of reference to the accented syllables. A different type of dependency exists when there is no tonal contrast and accented syllables receive a specific tone (typically a high tone). Yip (2002: 232 ff.) discusses various such examples. In Northern Tepehuan (Kim 1988), a H tone is assigned to the second syllable of trisyllabic words and the initial syllable of bisyllabic words; all other syllables have low tone.

Huave, as discussed by Noyer (1991), presents an interesting case that combines (limited) lexical contrast and predictable tone. Stressed syllables may have either a H or a HL tone, which Noyer analyzes by assigning a lexical L to the latter and then a H to all stressed syllables; all other syllables are low toned. The location of stress is predictable. It occurs on the final syllable if closed, otherwise on the penultimate syllable.

Suárez (1983: 52) refers to Huichol and Mazuhua where we find no tone contrast on the last two syllables or the last syllable, respectively. In these languages, inherent lexical tones are removed to free up space for intonational tones.

4.2.2. Accent dependent on tone

According to Suárez (p. 52–3), stress in Huichol and Tlapanec is dependent on tone. In the latter language, bisyllabic word with one H tone are

stressed on the syllable bearing that tone. If both syllables are H, or both are L and the second syllable has a long vowel, they are 'equally stressed'.

An interesting case is discussed in de Lacy (2002) and reported in Yip (2002). de Lacy discusses three Mixtec dialects. In Huajuapacan Mixtec (E. Pike and Cowan 1967), stress falls on the leftmost syllable when the tone is followed by a lower tone (HL, HM, ML) and, if this condition cannot be met, on the first syllable.

5. Languages by family[3]

In this section, we survey the accent systems of the languages of Middle America, organized by language family.

5.1. Oto-Manguean

The Oto-Manguean (also Otomanguean) language stock is a large complex group of language families spoken in Mexico. In the past, languages of this group were spoken further south in Central American as well. Ethnologue (Lewis 2009) list 177 languages for this family. The major groups within Oto-Manguean are Amuzgoan, Chiapanec-Mangue, Chinantecan, Mixtecan, Otopamean, Popolocan, Subtiaba-Tlapanecan, and Zapotecan.

The bulk of attention to the phonology of these languages involves tone, laryngeal features, and syllable shapes. Both laryngeal features and tone are lexical. The languages exhibit two to five level tones and often contour tones as well. Tone is lexically marked and is also used grammatically, and complex tone sandhi exists in many of these languages. See Campbell (1997), Suárez (1983), and Rensch (1976), among others, for overviews.

Hollenbach (1984) provides a clear set of minimal pairs from Copala Trique that illustrates the heavy load on tone and laryngeals in the languages of this group.

3. For a map of Meso-American languages see: http://www.mywire.com/a/Intl-Enc-Linguistics/MesoAmerican-Languages/9460795/?&pbl=105

(4) Copala Trique tones and laryngeals

yu^{3}we^{35}	'palm mat'
yu^{3}we^{32}	'maguey'
yu^{3}we^{32}h	'cliff'
yu^{3}ʔwe^{32}	'marketplace'
yu^{3}ʔwe^{32}h	'thread'
yue^{3}ʔwe^{3}ʔ	'ice'

While much attention is given to tone, tone sandhi, laryngeal features, and the interaction between these, there is little work on stress, although stress is mentioned in almost every description of the languages of this stock.[4] This section focuses on the predictable stress rather than the lexical and grammatical tone. Intonation is also discussed in some of the literature, but is largely set aside here as well.

In general, stress in Oto-Manguean languages is morphologically conditioned, being attracted to a root or stem, with this morphological unit occurring near the end of the word. Rensch (1976: 11), in ground-breaking research on comparative Oto-Manguean phonology, reconstructs the stem as consisting of *one* syllable with a consonant onset, a vowel, an optional nasal, laryngeal elements, and a tone, together with possible preceding and following elements. In Proto-Oto-Manguean this syllable hosts the largest number of contrasts. Probably more than one syllable preceded this syllable, likely separated from it by a morpheme boundary; a syllable expressing person may have followed. Rensch notes that stress generally falls on the final syllable of the stem in contemporary Oto-Manguean languages, and posits that this was the case in Proto-Oto-Manguean as well (1976: 11); in a footnote, he remarks that in Cuicatec and Zapotec, stress is on the penultimate syllable. We will see that in many of the languages stems are generally single syllables, and other languages besides Cuicatec and Zapotec place stress on the initial syllable of the stem. Nevertheless, Rensch's generalization about the placement of stress on the stem is overall confirmed across this complex.

This stress-bearing unit, called the 'stressed ultima' or 'couplet' by Rensch (1976: 11) and sometimes referred to as the 'binary couplet', is

4. Since many sources do not distinguish between stress and accent (as we did in section 2), or use both terms interchangeably, we will use the terminology as we find it in the sources, where the use of the term 'stress' predominates.

the topic of much study in the language stock. This stress unit, or couplet, is basically equated with the stem, with stress reconstructed as falling on its final syllable. The couplet determines the distribution of segments and tone in many of the languages.

The following discussion is organized by language family within Oto-Manguean. There has been debate over the years about the internal organization of Oto-Manguean; see Rensch (1976) for a summary. The following classification is from Ethnologue (Lewis 2009).

It should be noted that the degree of detail presented differs from language to language, and, for many of the languages, there are no comments about stress in the literature. Much of the work on these languages was done in the 1950's and 1960's, and the terminology used is often unfamiliar today; we have tried to make terminology clear, while at the same time giving the reader a sense of the language descriptions. No material is available on the Chipanec-Mangue subfamily, but each of the other groups receives some attention in the following discussion.

5.1.1. Amuzgoan

Ethnologue (Lewis 2009) lists three Amuzgoan languages, which are spoken in the Costa Chica region of the Mexican states of Guerrero and Oaxaca by about 35,000 speakers.[5]

According to Bauernschmidt's (1965) study of syllable dynamics in Guerrero Amuzgo, the stem-final syllable is stressed; the stem can be followed by suffixes. The stressed syllable obligatorily comprises an onset and a nucleus, and can carry a tone (see also Williams (2005) for a discussion of tones in this language).

The phonetic realization of stress in Amuzgo is dependent on syllable type. Amuzgo exhibits a distinction, identified in many Oto-Manguean languages, between syllable types known in the literature as *controlled* and *ballistic*.[6] There is considerable discussion of this contrast in the literature, which is more or less equivalent to a distinction between long and short syllables. Bauernschmidt (1965: 472) notes distinctions between con-

5. It should be kept in mind that here and elsewhere the numbers of speakers provided for a given language are only approximate, often based on a census that may date back as much as 20 years. Most of the time, the numbers provided are gathered from the Ethnologue.
6. For the distinction between 'ballistic' and 'controlled' in the Oto-Manguean languages, see the recent study by Herrera (2009), who shows that, at least in this family, the distinction is expressed by a contrast between breathy voice and creaky voice vowels.

trolled and ballistic syllables having to do with stress. In particular, when stressed, the "checked nucleus of the ballistic syllable shows minimum duration of voicing; that of the controlled syllable shows maximum duration of voicing [where voicing refers to duration of voicing in the nucleus HRW]. Although unchecked stressed syllables do not show as pronounced a contrast in this respect, here too voicing tends to be shorter in the ballistic syllable nucleus. Unstressed syllables show no consistent contrast in duration of voicing." There are also some tonal differences between controlled and ballistic stressed syllables: controlled syllables show high and mid tones with a downward drifting pitch contour, and low tone with an upward drift. Ballistic syllables realize high, mid, and low tones as rapid downglides.

5.1.2. Chinantecan

The Ethnologue lists fourteen Chinantecan languages. The total number of Chinantec speakers is estimated at around 102,000. Most live in Oaxaca and Veracruz, Mexico, especially in the districts of Cuicatlán, Ixtlán de Juárez, Tuxtepec and Choapan.

Usually in the Chinantecan languages there is a single stress, occurring on the final syllable, the stem; pre-tonic and post-tonic syllables are not stressed. The stressed syllable often has greater phonological and morphological complexity than the unstressed syllables. Contrasts are generally diminished on pre-stem and post-stem material. In several of the Chinantecan languages, suffix tones are not contrastive, being determinable from the tone of the stem. Languages of this family exhibit the contrast between controlled and ballistic syllables introduced above; languages differ in constraints on ballistic syllables; see Silverman (2009) for a recent overview. This section is a brief review of the literature on stress in different languages of this subfamily.

StressTyp contains an entry for Lealao Chinantec:[7]

Chinanteco, Lealao [LEX]

Oto-Manguean, Chinantecan. North Oaxaca, San Juan Lealao, Latani, and Tres Ríos (Mexico).

- Stress is lexically distinctive. Words can be stressless. There is tone (not indicated).

ŋiː	'his/her voice'	fi	'road'
ˈŋiː	'high'	ˈfi	'handle'

7. In Part II of this book all StressTyp entries are presented with the sources that they are based on.

According to Rupp's (1990: 63) description of Lealao Chinantec "the phonological word is typically just one stressed syllable, although a verb may be realized phonologically as a string of as many as six syllables. The stressed syllable is the last syllable of the word unless the word ends with one of five unstressed person markers"; thus the stress falls on the last syllable of the stem. Rupp (1989: 3) further notes that most Chinantec words have simple roots or stems, and that the root is the domain for stress, by which he means that it is only the root that shows a contrast between controlled and ballistic syllables.

Silverman (1997), in a study of tone sandhi in Comaltepec Chinantec, notes that words are generally monosyllabic, with rare polysyllabic roots. Inflection is often found through modification of the root vowel, resulting in monosyllabic stems that bear stress (Silverman 2009).

Robbins (1968) and Gardner and Merrifield (1990: 93) observe for Quiotepec Chinantec that only one syllable per word is stressed, the stressed syllable representing a major class lexical item. Most such words are monosyllabic, but a few have a pretonic syllable marking categories such as tense-aspect and direction. In Quiotepec Chinantec, the pre-stem syllables occur with simple tones, not with contours, while the stem can have contours as well (Robbins 1968); post-tonic syllables have their tone determined by the tone of the tonic syllable. There are also post-tonic syllables that generally mark personal pronouns and possessors. These suffixes can affect the tone of the stem.

Westley (1971: 160), in a study of Tepetotutla Chinantec, observes that there is one stressed syllable per word, the final syllable. Foris (2000) finds for Sochiapan Chinantec stress occurs on the final syllable in polysyllabic words.

5.1.3. Mixtecan

Mixtecan is a large group with subgroups of Mixtec-Cuicatec and Trique with a total of 57 languages, according to the Ethnologue (Lewis 2009).

5.1.3.1. Cuicatec

The Cuicatecs inhabit the towns of Teutila and Tepeuxila in western Oaxaca. In 2000 they numbered around 23,000, of whom an estimated 65% still spoke the language. Two languages are listed under Cuicateco in the Ethnologue.

Cuicatec generally has stress on the first syllable of the unit called the couplet (see the discussion below), although Needham and Davis (1946)

note that its location is not well understood. They also say that stress may be attracted to a high tone at the end of a morpheme, although the conditions are not totally clear. Bradley (1991), in a study of the syntax of Concepción Pápalo Cuicatec, makes some notes about phonology. Roots are monosyllabic or bisyllabic, with stress on the first syllable and with stressed vowels being long.

5.1.3.2. Mixtec

At the end of the 20th century, the fifty-two Mixtecan languages listed in Ethnologue taken together were estimated to be spoken by about 300,000 people, in the Mexican states of Oaxaca, Guerrero and Puebla.

In the literature on Mixtec stress, the term 'couplet' is frequently encountered. K. Pike (1948) introduced the term 'tonemic couplet' in a study of San Miguel el Grande Mixtec, referring to this unit as the locus of contrastive tone (see also Gerfen (1996) for discussion). In the introduction of her detailed study of Mixtec phonological systems, Josserand (1983) notes that Proto-Mixtec and all modern and historically documented systems share a set of basic properties, one of which is the couplet, which she defines as "a microsegment composed of two syllables and carrying stress on the first of these two (1983: 180)." Josserand further notes that the first of these syllables is often marked by additional phonetic features such as vowel length, pre-aspiration of following consonants, or glottalization. It is also the syllable that is most likely to engage in tone perturbations, besides being the locus of paradigmatic consonant alternations and of stress. The couplet is claimed to be the basis for word building and is similar to a grammatical unit, but there is no categorical one-to-one relation between morpheme (root or stem) and couplet (181). In Josserand's own terms "It is more satisfying to understand the couplet as a phonological or surface form for underlying morphological material to fit into, or accommodate itself to, for its spoken realizations. Nonetheless, the couplet is essential for the description of the morphological canons, i.e., the base forms and morpheme structure rules which precede the morphotactic processes so common in all Otomanguean languages" (183). This position is widely adopted in the literature. According to Suárez (1983: 53) stress in Mixtec languages usually falls on the first syllable of the root and remains invariable when affixes are added. North and Shields (1977) consider the couplet as the nucleus of both the phonological and grammatical word (citing K. Pike 1948, among others), as well as the relevant unit for tone contrasts. Thus, in Mixtecan in general, the couplet appears to be an

important unit, attracting stress and allowing several contrasts that are not found elsewhere. In current terminology, the couplet might be referred to as a trochaic foot.

In his discussion of the couplet in Mixtec, DiCanio (2008) comments on its status in several languages of this family. Faraclas (1983) states for Chalcatongo Mixtec that the basic stem is disyllabic, CVCV or CVV, sequences that were composed probably of two [or more] morphemes historically. In the same language, glottalization is restricted to couplet-initial syllables (Macaulay 1996). In Coatzospan Mixtec (Gerfen 1999), glottalization is licensed under stress, with the stressed syllable being initial in the word, and, in compounds, the initial syllable of the first morpheme is stressed.

Pankratz and E. Pike (1967) discuss stress in Ayutla Mixtec, saying that the couplet coincides with the grammatical stem (288), with stress generally falling on the first syllable of the couplet. The couplet can be preceded and followed by affixes. Some examples are given below, where the acute accent represents stress and the numbers tone.

(5) Ayutla Mixtec

couplet only	ñú^{2}ma^{3}	'wax' (292)
precouplet + couplet	ʃi^{3}-dú^{2}ʔva^{3}	'spider web' (292)

Pankratz and E. Pike remark that each phonological word has a word stress, occurring on the couplet or on a post-couplet syllable. Tone functions as a conditioner for the placement of word stress, which is attracted to what they call tone 1 (high tone) in a couplet or post-couplet syllable, whereas, in the absence of a tone 1, word stress goes on the first syllable of the couplet, as is illustrated in the examples below (cf. section 4.2.2.):

(6)

ʃí^{1}ñu^{1}ra^{1}	'his pineapple' (293)
ku^{1}-tátạ̀^{1}ra^{1}	'he is taking medicine' (293)
ku^{2}nu^{3}rá^{1}	'his tobacco' (293)
sa^{3}ta^{3}-rá^{1}	'he bought' (293) (Couplet plus postcouplet)

In Mortensen (2005), the distribution of stress in this language is defined by way of a more intricate set of conditions:

(7) Tone-dependent stress in Ayutla Mixtec

Within the stem + suffix domain, stress the leftmost H-toned syllable immediately followed by the L-toned syllable, else stress the leftmost M-toned syllable immediately followed by a L-toned syllable, else stress the leftmost H-toned syllable, else stress the leftmost syllable.

Interestingly, Mortensen suggests that Pankratz and E. Pike's tone-dependent stress is likely to represent phonetic pitch prominence.

In Huajuapan Mixtec, E. Pike and Cowan (1967) also identify the couplet as an important unit, with stress on the first syllable of the couplet unless there is a following syllable within the word with a lower tone; in that case, word stress occurs on the syllable preceding the lower tone; stress never precedes the couplet. Tones are mostly predictable on non-stem morphemes.

North and Shields (1977) discuss stress in their work on Silacayoapan Mixtec. This language also has stress on the first syllable of the couplet. There are conditions under which stress (and high tone) shift to the second member of the couplet.

In their very clear description of the phonology of Mixtepec Mixtec, E. Pike and Ibach (1978) observe that in this language the first syllable of the couplet is marked by a lengthened vowel unless it is followed by a glottal stop. It is also stressed, indicated by loudness. They note that, if tone 1 (high) or tone 2 (mid) precedes tone 3 (low), the syllable preceding the tone 3 may be louder than the first syllable: *vi*^{1}*lu*^{1}*-yu* 'my (polite) cat' (272). They note that the loudness is particularly noticeable on the tone clusters 1-3 and 2-3. There are allotones as well as tone sandhi.

Gerfen (1996, 1999) offers a discussion of Coatzospan Mixtec. Gerfen (1996: 47) defines the couplet as the open class set of morphemes characterized by the shapes CVV and (C)VCV, with some rare exceptions. Stress is located on the penultimate syllable of the word, with enclitics ignored for the purposes of stress. The stressed syllable is longer, and is the site of contrastive tone.

In a study of Alacatlazala Mixtec, Zylstra (1980: 16) remarks that stems consist of two or three syllables, where the three syllable stems are generally compounds. The word has a single stress, falling on the initial syllable of the couplet, but shifting to the second syllable when the first person postclitic is attached, and on the second syllable of a three-syllable stem. Tones are contrastive within the couplet.

The language called Pinotepa Nacional Mixtec in Ethnologue and Jicaltepec Mixtec by Bradley (1970) is analyzed as having two stresses, an initial 'microstress' which is part of the couplet, and thus on the initial syllable of the stem, and a 'macrostress', or sentence stress.

The couplet is also relevant in the analysis of Molinos Mixtec (Hunter and E. Pike 1969). Hunter and E. Pike propose that the placement of stress depends on the tone sequence and the position of the couplet within the word, with stress occurring within the couplet. It can occur on either the first or the second syllable of the couplet depending on the tones. Hunter

and E. Pike further propose that if the tones are all level 1 (high) or 2 (mid), then all syllables are equally stressed. Hunter and E. Pike note that the couplet is relevant for the placement of stress, for the distribution of some sounds and the distribution of allophones of others, and tone sandhi.

E. Pike and Oram (1976) discuss stress in Diuxi Mixtec. As in many other Mixtec dialects/languages, stress falls on the first stem syllable and conditions lengthening of the first vowel or second consonant. According to E. Pike and Oram (1976), a *second* unpredictable stress occurs in Diuxi Mixtec on the second syllable of some stems, but Daly (1978) analyzes these alleged stem-final stresses in terms of tone.

The Mixtec languages are very similar in terms of stress, as one concludes from the numerous studies devoted to this language group. Across Mixtec, stress is on the first syllable of the couplet, which can be equated with the stem, forming a trochee. This is the site where contrastive tones occur in many of the languages as well as other phonological features.

5.1.3.3. Trique

The Trique languages differ from the other members of the Mixtecan group in the placement of stress. Ethnologue identifies three Trique languages. DiCanio (2008) is a recent source on Trique, with interesting discussion of the historical development of this group.

In the Trique languages, stress is word-final, falling on the root. This is also the position of greatest contrast of other phonological features. Tones contrast on this final syllable, being predictable on syllables that precede it (e.g., Hollenbach 1984: 10).

In DiCanio's (2008) analysis of Itunyoso Trique, stress is word-final, implemented by an obligatory bimoraic structure in final syllables (nonfinal syllables are light) and a larger set of licensed contrasts. Similar patterns are found in Copala Trique, where the final syllable carries tone and has a greater potential for contrasts in terms of consonants, vowels, and tone than other syllables (Hollenbach 1977, 1984). Similarly, in Chicahuaxtla Trique, the largest number of contrasts occurs in the final syllable: the opposition between fortis and lenis consonants is only functional in this syllable, while it is neutralized elsewhere. Also, the final syllable is longer than the prefinal syllables and hosts a greater number of tonal constrasts (Longacre 1952). Hollenbach (1977: 50) notes that there is phonetic stress on penultimate syllables with mid tone and on penultimate syllables before a final syllable with a medially-checked vowel (V?V, VhV). Suárez (1983: 52) remarks that Chicahuaxtla Trique has stress on the final

syllable of the word. Di Canio concludes that root-final stress is a shared characteristic of the Trique languages.

5.1.4. Otopamean

Seventeen different languages compose the Otopamean family of Mexico, which are classified in four major subgroups: Chichimec (one language) spoken in the state of Guanajuato, Matlatzincan (two languages) in the state of Mexico, Pamean (two languages plus one extinct) in the state of San Luis Potosi, while Otomian is subdivided into Mazahuan (two languages), spoken in Michoacan, and Otomian (nine languages) spoken in the states of Puebla, Veracruz, Queretaro, Hidalgo, and Tlaxcala. The numbers of speakers vary greatly among the languages of this family, ranging from over 350,000 speakers for Central Mazahua to the nearly extinct Atzingo Matlatzinca.

In reconstructions of the Proto-Otopamean vowel system, Bartholomew (1989) proposes that the root contained a vowel or vowel cluster and an optional glottal element; if the vocalic element was a single vowel, that vowel was rearticulated after the glottal element (V?V or VhV), if it was a vowel cluster, the glottal element was articulated between the vowels.

5.1.4.1. Chichimec

Chichimeca-Jonaz (Lastra de Suárez 1984) is a tonal language, with a high tone on one or more syllables. Bisyllabic stems can be HL, LH or HH and, apparently rarely, LL. Trisyllabic stems can be HLL, HLH, LHL, LHH, and so on. No mention is made of stress. Lastra de Suárez does not describe the tonal system, but she marks tone in examples.

5.1.4.2. Matlatzincan

Pérez (2007) is a study of Matlatzincan languages of the Oto-Pamean family, Matlatzinca and Ocuilteco, also known as Tlauica. Roots in Matlatzinca are generally monosyllabic, although consonant-final roots have an epenthetic final vowel, showing different patterning than the rare bisyllabic roots. Pérez does not discuss stress in Matlatzinca, and her discussion of tone is quite tentative. Escalante (1999) identifies two tones in Matlatzinca and discusses tone sandhi, without any mention of stress.

Muntzel (1986), in a study of the structure of Ocuilteco, notes that

primary accent falls on the first syllable of the verb or noun root, causing a slight lengthening of the vowel, which does not acquire the duration of the distinctively long vowels. Perez (2007: 128) notes that she did not hear stress in Tlawika, suggesting the existence of dialect differences.

5.1.4.3. Otomian

5.1.4.3.1. Otomi

Nine Otomi languages are listed in Ethnologue. For those Otomi languages with reasonable descriptions, the stem is reported to consist of two syllables, with stress on the first syllable. As in most other languages in the stock, that syllable is the locus of greater contrast in terms of both segmental properties and tone.

Word stress in Mezquital Otomi is described by Wallis (1968) as falling on the first syllable of a bisyllabic sequence referred to as the 'nucleus', with the stressed vowel being long and with distinctive tone on the nucleus, or the stem.

In Tenango Otomi, as described by Blight and E. Pike (1976), stress falls on the first syllable of the stem, which can be preceded by prefixes. Stress affects the realization of consonants, as, for instance, in the case of the phonemic voiceless fortis stops that are preaspirated when they are initial in a stressed syllable (and not part of a cluster). The first syllable of the stem is stressed; it can be preceded by prefixes. The full range of tonal contrasts is found on stressed (stem) syllables, with a reduced set on prefixes.

In Temoayan Otomi, Andrews (1949) reports that stress falls on the first syllable of the root. She remarks that stress and tone are independent, with some tones restricted to the stressed syllable, or the root, which is thus the locus of greater contrasts.

5.1.4.3.2. Mazahuan

Ethnologue lists two Mazahua languages. In these languages, stress occurs on the first syllable of the stem, which is composed of a root and a stem formative, as discussed in E. Pike (1951). Stress is accompanied by vowel lengthening (38) and, as expected, the greatest differentiation of tone occurs on the stressed syllable. There is also an intonational pitch, which is final, and tone is not contrastive on the final syllable.

5.1.4.4. Pamean

Ethnologue identifies three Pamean languages. Both Northern Pame and Central Pame have many speakers, while Jilipian Pame is extinct. In his

detailed study of Northern Pame, Berthiaume (2003) remarks that stress falls on the lexical root (65), and contrastive tone is found only on the stressed syllable (41). With one exception, roots are monosyllabic. The pitch of the non-stressed syllables is determined by the pitch of the root. Berthiaume also reviews earlier work on Pamean. In a discussion of Manrique Castañeda's work on Jilipian Pame, he reports that stress falls on the lexical root, which is also the domain of contrastive tone (Berthiaume 2003: 17). In Central Pame, based on work by Gibson (1956), stress is also on the lexical root, and tone is contrastive only in stressed syllables (Berthiaume 2003: 18).

5.1.5. Popolocan

Popolocan is another major group of the the Oto-Manguean language stock, divided into Chocho-Popolocan, the Mazatecan group, for which Ethnologue distinguishes eight different languages with about 185,000 speakers altogether living in the states of Oaxaca, Veracruz and Puebla, and Ixtecan, spoken by 128 individuals in Santa María Ixcatlán in southern central Mexico. Chocho-Popolocan itself is subdivided into Chocho, spoken in the state of Oaxaca by around 770 speakers and Popolocan, comprising seven different languages with approximately 60,000 speakers in the state of Puebla.

5.1.5.1. Chocho-Popolocan

In her study of Metzontla Popoloca, Veerman-Leichsenring (1984, 1991) notes that stress, which is realized primarily as duration, falls on the penultimate syllable of a word. Stops and affricates are preglottalized, while liquids, approximants, and nasals are lengthened: /čàkᵱ/ 'fàce' [čàʔkᵱ]; /tīyé/ 'night' [tīy·é] (page 21). With aspirated consonants, prenasalized consonants, and voiceless nasals, the consonants are essentially split, creating a phonetic sequence. When the syllable contains a long vowel or vowel sequence (including a vowel followed by a glottal stop), the vowel is long. In general, it is the consonant that shows the effects of accent, and with monosyllabic words, a prothetic vowel may appear (/kū/ 'animal' [ìʔkū] (page 22).

In Western Popoloca (Williams and E. Pike 1968: 379), the stressed syllable usually, but not always, coincides with the end of the grammatical stem. In Northern Popoloca (Stark 1976), tone is contrastive in stems; stem tones may override prefix tones. Kalstrom and E. Pike (1968) discuss stress in Eastern Popoloca. The penultimate vowel of the stem (the nucleus

of the phonological word) receives stress, with the stressed component being long, either by consonant lengthening or vowel lengthening.

(8) nte:^{4}to^{2} 'tall'
nkã:^{3}õ^{2} 'liver'

With certain suffixes, the stress is realized as what the authors call consonant stress, lengthening the last consonant of the root.

(9) tʃi:^{3}ka^{3} 'metal object'
tʃi^{4}ka^{4}n:a^{23} 'my metal object'

Words with this stress type are noted to be infrequent.

Consonant lengthening affects the initial consonant of the last syllable. However, when certain suffixes follow, the initial consonant of the suffix lengthens.

(10) to^{1}t:e^{4} 'woman's shawl'
to^{1}te^{4}n:a^{13} 'my shawl'

There are also vowels inserted in phrases, referred to as rhythmical syllables.

(11) kʔoe^{4}n:a^{2}thã^{3}h:ma^{4} 'she bought beans' h:ma^{4}
i^{2}h:ma^{4} kʔoe^{4}n:a^{2}thã^{3} 'beans she bought' i^{2}h:ma^{4}

Stark and Machin (1977), in a study of Tlacoyalco Popoloca, also identify two types of stress, consonant stress and vowel stress, each marked by duration. Consonant stress occurs on the final syllable and moves when a suffix is added.

5.1.5.2. Mazatecan

In a study of comparative Mazatecan, Kirk (1966: 9) reconstructs for Proto-Mazatec heavy stress on the final syllable of the stem, with weak stress elsewhere. This system is also found in the contemporary Mazatec languages studied by this author (1966: 13).

E. Pike (1956: 71) notes for Soyaltepec Mazatec that stress falls at the end of the grammatical word. She further points out that non-phonemic length of consonants is found in stressed syllables, which is different for Huautla Mazatec, where this length is not found.

5.1.6. Subtiaba-Tlapanecan

The status of the Subtiaba-Tlapanecan group as part of Oto-Manguean has been of some debate. Its phonology is not well described in the avail-

able literature. Suárez (1983: 52) notes that in Me'phaa (formerly called Tlapanec) stress is determined by tones, with the second syllable of a bisyllabic word made prominent with a low-high tone sequence and the first syllable with a high-low tone sequence.

5.1.7. Zapotecan

With approximately 482,000 speakers, the Zapotecan family of Mexico is one of the largest families in the Otomanguean stock, not only in terms of its number of speakers, but also as regards the number of different languages. The Chatino subbranch contains seven different languages, spoken in the state of Oaxaca, whereas for the Zapotecan subgroup, Ethnologue distinguishes as many as fifty-seven different languages, all spoken in the states of Oaxaca and Veracruz.

5.1.7.1. Chatino

StressTyp contains an entry for Yaitepec Chatino:

Chatino, Yaitepec (dialect of Chatino) [U]

Oto-Manguean, Zapotecan, Chatino. Oaxaca (Mexico).
• Stress falls on ultimate syllable.

ˈslyaʔ	'cotton'	tiˈʔa	'water'
kwiʔˈya	'eagle'	tši ˈkwiʔ	'to talk'

Upson and Longacre (1965: 314) reconstruct final-syllable stress for Proto-Chatino. Upson (1968: 3), referring to the contemporary Chatino languages, observes that stress falls on the last long vowel of the stem, and, in the absence of long vowels, on the stem-final syllable. Stressed vowels are longer than unstressed vowels.

Pride (1984), in a study of Tataltepec Chatino, reports that the final syllable is the tonic or stressed syllable. The full set of vowel phonemes occur in this syllable, with phonetic lengthening. Pride notes that the tonic syllable is the minimal phonological word, which may be preceded by up to three syllables. Tone contrasts are also greatest on the tonic syllable, with seven contrastive tones. He proposes a four-way tone contrast on the penult, and a two-way contrast elsewhere. In Yaitepec Chatino as well, the final syllable is stressed (Pride 1963: 19). The final syllable is the sole carrier of contrastive tone and the contrastive presence or absence of nasalization and glottal stop.

5.1.7.2. Zapotec

Zapotec is a complex group of 57 languages. In Zapotecan, stress usually falls on the root, which is one or two syllables long, and, most of the time, the stressed syllable predictably lengthens.

In Cajonos Zapotec, stress falls on the root (Nellis and Hollenbach 1980), which is typically one or two syllables long, with some exceptional three-syllable roots. Stress is reported to be penultimate in a vowel-final polysyllabic root and final otherwise. Root stress is retained under suffixation. Fortis consonants are longer after a stressed vowel; stressed vowels lengthen before lenis consonants. Recent Spanish loans retain the stress position of Spanish.

For Isthmus Zapotec, Marlett and Pickett (1987: 406) find that stress falls on the first rhyme of the root. In earlier work on the phonology of this language, Pickett (1951) argues that stress placement is predictable. Marlett and Pickett further report that branching rhymes are found only in stressed syllables. After a stressed vowel, obstruents lengthen phonetically; otherwise, the vowel lengthens.

In Zoogocho Zapotec, stress falls on the penultimate syllable of the stem (Sonnenschein 2005); in a stem consisting of two roots, it falls on the second. The phonological shape of the word base is CV(C(V)).

Sicoli (2007), in a study of three Zapotec languages of the Sierra Sur of Oaxaca, notes a bimoraic minimum. Stress-induced consonant lengthening occurs, similar to that found in Isthmus Zapotec (Mock 1985). In both cases, the vowel of the stressed syllable lengthens unless it is followed by a fortis consonant, in which case that consonant lengthens.

In Guelavía Zapotec (Jones and Knudson 1977: 163) there is one stressed syllable per word, generally the penultimate syllable. The stressed syllable tends to have higher pitch, lengthening of a following fortis consonant, and lengthening or rearticulation of vowels with a following lenis consonant or when syllable-final.

Tilquiapanz Zapotec (Merrill 2008) has stress on the root syllable. Merrill notes that it usually falls on the final root syllable, but sometimes on the penultimate syllable. Glottalized vowels are possible only in the root syllable, while word-final unstressed vowels usually devoice.

Choapan Zapotec (Lyman and Lyman 1977) also has one stressed syllable per word. Stress must occur on a complex nucleus unless all nuclei are of equal length, in which case it is penultimate (Lyman and Lyman 1977: 149). Affixes are more restricted in terms of syllable shape than stems are.

Beam de Azcona (2004) is a study of Coatlán-Loxicha Zapotec. Most words are monosyllabic due to the historical deletion of non-tonic vowels. The only syllable of the stem bears stress. The few polysyllabic words, which are historical compounds, have final stress. Stressed syllables can take any tone; unstressed syllables only realize high tone.

In San Francisco Ozolotepec Zapotec (Leander 2008), roots are composed of a single syllable, which also realizes the stress. Unstressed vowels are centralized and sometimes deleted (43), with the stressed syllable hosting the largest number of contrasts. San Juan Mixtepec Zapotec, as studied by Nelson (2004), has roots that are generally a single syllable, which bears the stress.

Simple stems are monosyllabic in Guevea de Humboldt Zapotec (Marks 1980). In compounds, the final syllable is stressed. The stressed syllable undergoes a variety of morphophonemic changes.

5.1.8. Summary: Oto-Manguean

In the above survey, we have discussed the word prosody of the Oto-Manugean languages for which we have found useful descriptions in the literature. In these languages, lexical and grammatical tone is usually found, as well as some interesting laryngeal contrasts. There is ample evidence that in languages of the Oto-Manguean family the root is the locus of stress and, expectedly, it is also the position that shows the greatest number of phonological contrasts. While Rensch (1976) reconstructs a two-syllable stem for Proto-Otomanguean with stress on the first vowel, there are languages in which the second stem-vowel is stressed, as well as languages that have single-syllable stressed roots. A common feature of all the languages of this family is that the root licenses more segmental and tonal contrasts than affixes do. Moreover, the root is obligatorily bimoraic in the majority of languages. In general, no mention is made of the phonetic properties of stress.

Oto-Manguean languages have been cited as stress-attracting tone languages and as tone-attracting stress languages (see section 4.2). In the former, tone is lexical while stress is predictable. In our interpretation, the richness of tonal contrasts that occurs in the stressed syllable is a consequence of the fact that stress is a feature of the root; stress is morphologically controlled, and because it is, we expect to find the full range of contrasts in the stressed root syllable. Several of the languages have been argued to show tone-dependent stress systems, with stress attracted to certain tones, and, in some cases, more than one stress depending on

tone. While this analysis may account for the facts, it might not be the only one possible. Higher-level intonation may play a role, as is evident in many of the descriptions, where stress is described at different levels of structure. This is clearly an area for further study.

5.2. *Mixe-Zoque*

The Mixe-Zoque languages are spoken in and around the Isthmus of Tehuantepec, Mexico. Mixe has around 90,000 speakers, Zoque has some 60,000 speakers, and the Popoluca languages, of which some are Mixean and some Zoquean, have approximately 69,000 speakers.

Wichman (1995) offers a classification of the Mixe-Zoque group, for which the Ethnologue lists 17 languages, based on comparative evidence, including evidence from stress:

(12)

Mixean	Oaxaca-Mixean	Lowland Mixe: Coatlán, Guichicovi Midland Mixe: Japtapec South Highland Mixe: Tlahuiltepec North Highland Mixe: Totontepec
	+Tapachulteco Oluta Popoluca[8] Sayula Popoluca	
Zoque	Gulf Zoque	Ayapa Zoque Texistepec Zoque Soteapan Zoque
	Chimalapa Zoque (Oaxaca) Chiapas Zoque	Santa Maria Chimalapa San Miguel Chimalapa

Here we review the information that Wichmann supplies about the Mixean languages and his reconstruction of proto-Mixe-Zoquean stress. Wichmann does not discuss the stress systems of the contemporary Zoquean languages, but refers to different bibliographical sources for information (page xiiv).

In Tlahuiltepec (Wichmann 1995: 25 (based on Lyon 1980: 33)), primary accent is on the last heavy syllable of the word or, if there is no heavy syllable, on the final syllable. In Jaltapec (Wichmann 1995: 47), accent is on the final syllable if it is closed or ends in a long vowel, otherwise stress is on the penultimate syllable. This generalization does not apply to suffixes or enclitics and loans from Spanish. In Coatlán (Wichmann 1995:

8. The PopolUcan languages in this family should not be confused with the PopolOcan languages in the Oto-Manguean family.

47; Hoogshagen 1984: 5), "stress occurs on the last syllable of an uninflected word that ends in a consonant or a long vowel and on the next to last syllable of an uninflected word that ends in a short vowel. Stress occurs on the last syllable of the stem of an inflected word unless a stress carrying suffix is present, in which case the suffix will carry the stress. The stress-carrying suffixes are *-yi:* (object person foxcus), *-i:* (nominalizer) and *-o?* (repetitive)." In Guichicovi (Wichmann 1995: 60), accent falls on the rightmost heavy syllable. Wichmann does not mention where stress falls in words that have no heavy syllables.

According to Wichmann (1995: 81): "although both [Sayula and Oluta Popoluca] verge toward having phonemic stress, stress assignment rules in both languages can be shown to directly reflect [Proto-Mixean] stress rules which were automatic." In Sayula Popoluca accent goes on the rightmost heavy syllable or else to the leftmost syllable in the rightmost root. Certain suffixes are inherently accented (Wichmann 1995: 81). In Oluta Popoluca accent is final if the final syllable ends in a consonant or has a long vowel, otherwise it is penultimate. Wichmann remarks that in this language most syllables are closed because of a process of final glottalization. This may obscure the fact that Oluta Popoluca has a 'right most heavy' pattern (Wichmann 1995: 85).

In Totontepec, accent is on the rightmost heavy syllable, otherwise on the final closed syllable, otherwise on the penultimate syllable (Wichmann 1995: 81, after Schoenhals and Schoenhals 1965: 302). Wichmann proposes that the stress pattern of Sayula Popoluca, where accent goes to the rightmost heavy syllable, or else to the leftmost syllable in the rightmost root, may be applicable in Totontepec as well, considering this from the perspective of reconstruction of proto-Mixean.

Wichmann's reconstruction for proto-Mixean emphasizes the recurrence of stress on the rightmost heavy syllable. He suspects that this feature goes back to proto-Mixe-Zoquean, but the Zoquean languages lost distinctive length. Zoquean then generalized in one of two directions: root stress (since roots would be the typical locus of heavy syllables) or, focussing on the default pattern when heavy syllables were absent, right-edge stress.

For proto-Mixean languages Wichmann reconstructs the following rule:

(13) a. accent is on the rightmost heavy (V:, V:ʔ, Vʔ, Vh)

b. else on the rightmost root: verbs: ultimate, nonverb: penultimate

c. Some suffixes are inherently accented and as such attract the primary accent

His reconstruction for stress in proto-Zoquean is given in (14) (p. 89):

(14) a. Stress in on/in the root: verbs: ultimate, nonverb: penultimate/first syllable
b. Some suffixes are inherently accented and as such attract the primary accent

For proto-Mixe-Zoquean Wichmann reconstructs the system as essentially identical to that of Proto-Mixean.

5.2.1. Mixe(an)

Ethnologue (2009) lists three major Mixe languages, Eastern, Veracruz, and Western, each of which has several dialects. Here we describe the stress pattern of Ayutla Mixe (South Highland Mixe), based on Romero-Méndez (2008: 80 ff.). In this language stress is word-final for all parts of speech except for verbs, which have stem-final stress. Phonetically, stress involves higher pitch and greater intensity. In compounds, the last syllable of the second root is stressed:

(15) (a) käj-ˈtse'e 'chilacayote/cidra'
jaguar-pumpkin
(b) kapy-ˈkäp 'bamboo basket'
bamboo-basket

Prefixes do not interact with stress patterns. When a prefix is added, the root still bears the stress (16):

(16) (a) në-ˈmajtsk 'second'
ORDINAL-two
(b) t-ak-ˈjo'kx 's/he heats it'
3A-CAUS-heat
(c) a-ˈkë'ëy-y 'lid'
EDGE-cover.with.hands-DEP

In the verb, it is possible to add as many as three syllables to the right of the root, while the main stress remains on the last syllable of the root:

(17) (a) ˈpëjk-ë-p 's/he got sick'
be.sick-INV-INDEP
(b) ˈpëjk-ë-të-p 'they got sick'
be.sick-INV-PL-INDEP

(c) ˈpëjk-ë-në-ˌtë-p ‘they have got sick’
be.sick-INV-PERF-PL-INDEP

(d) aˈmëjk-ë-në-ˌtë-p ‘they have had nightmares’
have.nightmare-INV-PERF-PL-INDEP

The plural marker, which can be used with only a few nouns, is the only inflectional suffix that nouns can take. In this case, the suffix receives stress:

(18) (a) mëˈjä’äy ‘old person’ vs.
(b) mëˌjä’äy-ˈtëjk ‘old people’

In contrast, the diminutive marker does not take primary stress:

(19) ˈtëjk-u’unk ‘little house’

Clitics cannot bear stress, even if they are in final position.

In a trisyllabic word, the leftmost syllable receives secondary stress and the last syllable retains the primary stress, as in (20). If the third syllable in a trisyllabic word is a suffix, then the stress goes on the second syllable and there is no secondary stress, as in (21).

(20) a) [ˌnɨtɨˈgɨːk] ‘third’
b) [ˌdagamˈbikʲ] ‘s/he makes him angry’
c) [ˌajɤːˈʌʂp] ‘very poor’

(21) a) aˈmëk-ë-p ‘s/he has nightmares’
be.sick-INV-INDEP
b) amˈtoo-të-p ‘they hear’
hear-PL-INDEP

It is possible to have a secondary stress to the right of the stem, but only if there are more than two syllabic suffixes, as in (17c–d) above. In cases like this, the last syllable of the root bears primary stress and the last syllable of the word has the secondary stress. Romero adds (p. 83): “As far as I have seen, some other Mixe languages seem to have a stress pattern very similar.”

5.2.2. Zoque(an)

Three major Zoquean groups are indicated in Ethnologue, Chiapas Zoque, Oaxaca Zoque, and Veracruz Zoque, each with some subdivisions. StressTyp contains one entry for this subfamily:

Zoque, Copainalá [P]

Mixe-Zoque, Zoque, Chiapas Zoque. Copainalá, Northern Chiapas (Mexico).

- Primary stress falls on the penultimate syllable of the stress group.
- Secondary stress on the first syllable if there are three or more syllables.

ˌminˈkeʔtpa 'he is coming again'

ˌminsukkeʔtpaˈʔitti 'they are coming again'

According to Hurch and Rhodes (1996) clashes are allowed. All stressed vowels lengthen.

(22) [ʔàːnáːsa] 'orange'

[hèʔepíkpa] 'he is breathing'

In Sierra Popoluca (Gulf Zoquean), according to Foster and Foster (2008), the primary stress occurs on the penult of most parts of speech, but in verbs the stress is on the final syllable.

5.3. Totonacan

The Totonacan family, consisting of twelve languages, is divided into two major groups in Ethnologue (Lewis 2009), Tepehua and Totonac. A considerable amount of work has been done on this language family recently, which we discuss in this section. Recent work suggests that there might be a relationship between Totonacan and Mixe-Zoque (see Brown, Beck, Kondrak, Watters, and Wichmann forthcoming).

McFarland (2009) cites an unpublished study by MacKay, who argues that primary stress in Totonaco-Tepehua falls on the final syllable when it is heavy and on the pre-final syllable when the final syllable is light. The definition of heavy syllable varies from language to language, but it is generally CVV or CV(V)C, where the final consonant is h, ʔ, m, n, l, y, w. While this regular pattern is encountered in the various languages that are discussed below, in some languages this system is broken by construction-specific stress patterns and by forms which do not meet the generalization. For this reason, these languages are often described as having phonemic stress.

5.3.1. Tepehua

Three languages are recognized under Tepehua in Ethnologue, Huehuetla Tepehua (3000 speakers), Pisaflores Tepehua (4000 speakers), and Tlachichilco Tepehua (3000 speakers); all are spoken in western central Mexico.

5.3.1.1. Tlachichilco Tepehua

According to Watters (1980), Tlachichilco Tepehua has one stressed syllable in a word. Prestressed syllables have mid pitch; stressed and post-stress syllables are high in pitch except before pause. There are adjustments in speech, with word boundaries often lost. Stress is maintained but the intonation pattern suggests a single word with high pitch falling on the last stressed syllable in the intonational phrase. Watters (1988) adds that Tlachichilco Tepehua has stress on a final syllable if it is heavy; otherwise stress is penultimate. There are two exceptions.

5.3.1.2. Huehuetla Tepehua

Kung (2007), in a study of Huehuetla Tepehua, is concerned largely with stress placement. She distinguishes for this language three stress patterns, one in native words, a second in ideophones, and a third in loanwords (Kung 2007: 104). She also notes that stressed vowels are lengthened (2007: 31).

In native, non-ideophonic words, there are two degrees of stress, with primary stress on the ultimate, penultimate, or antepenultimate syllable; its particular placement depends on syllable structure, word length, and word class. More generally, Kung notes that primary stress falls on the final syllable if it ends in a sonorant (m, n, l, r, ɾ) or glide (h ʔ w j) (23); otherwise the penult is stressed (24). Long vowels do not attract primary stress (25). Secondary stress is assigned to alternate syllables preceding the primary stress. The first column in the examples indicates the orthographic representation of the word. The examples below are taken from Kung (2007: 108–123)

(23) Final sonorant-closed syllable

7akminaaw	/ʔa-k-min-a/-w/	[ʔˌak.miˈaːu]	‘we excl will come’
laqtz’in	/laqts’in/	[laq.ˈts’in]	‘she sees it/him/her’

(24) Final syllable open or closed by non-sonorant

k’i7ut’i	/ki-ʔu-t’i/	[k’i.ˈʔu.ɗi̥]	‘you eat me’
palata	/palata/	[pa.ˈla.ta]	‘more, better’
p’it’ilh	/p’it’i-li/	[ˈɓi.ɗɪɬ]	‘she scrubbed it’

(25) Final long vowel

7e7eyxtaa	/aqejʃtaː/	[a.ˈʔeiʃ.taː]	‘tree species’

There are some prefixes that cannot take primary stress, with stress unexpectedly falling on a final syllable that ends in a non-sonorant. Kung

also notes that there are noun suffixes that cause violations of the stress patterns.

Ideophones show their own stress pattern, with primary stress on the first syllable and secondary stress on all subsequent syllables.

(26) chilili [ˈtʃi.ˌli.ˌli] 'sensation of fear'

In Spanish loanwords, primary stress falls on the syllable that corresponds to the stress-bearing syllable in Spanish, with secondary stress on alternate syllables. The Spanish word is shown in the third column, with its stressed syllable underlined. Only primary stress is shown.

(27)	7abonalaa	[ʔa.βo.ˈna.laː]	abonar	'fertilize'
	kaapeen	[kaːˈ.peːn]	café	'coffee'
	7aarreesgaalaa	[ˌʔaː.reːs.ˈgaː.laː]	arresgar	'take a chance'

5.3.2. Totonac

Ethnologue (Lewis 2009) lists nine Totonac languages, altogether spoken by some 200,000 speakers in central western Mexico. As discussed above, stress generally falls on one of the last two syllables in this family, but there are numerous surface counterexamples to this generalization. Length and laryngealization are contrastive in these languages.

5.3.2.1. Papantla Totonac

In Papantla Totonac (Levy 1990: 25), primary stress is contrastive: ˈpaʃa 'take a bath 2P SG' vs. paˈʃa 'take a bath 1P PL', although it generally falls on the penultimate or final syllable. The first syllable of a word generally bears secondary stress (MacKay 1999: 409). Levy (1991) further proposes that inflectional affixes are outside the domain of stress assignment, and that stress falls on the final syllable of the imperfective and the penultimate syllable of the perfective; see MacKay (1999) for discussion. Levy (1987: 107) notes that primary and secondary stress are realized phonetically as intensity and perhaps as 'higher' pitch.

5.3.2.2. Upper Necaxa Totonac

Upper Necaxa Totonac is analyzed by Beck (2004: 4) as having phonemic stress, with stress differentiating words of different lexical classes and marking person-aspectual distinctions in some verb classes. Stress is generally final in words ending in a long vowel or a closed syllable and, except

in verbs, penultimate in words ending in a short vowel. In verbs, stress is on the final syllable, except for verbs in the perfective aspect or the second person, in which case it is penultimate.

Stress is realized as increased duration and, to a lesser degree, as amplitude. Stressed short vowels are the same duration as long vowels, while stressed long vowels are not consistently longer than unstressed long vowels, but instead stress is marked with a rising tone.

5.3.2.3. Huehuetla Totonac

Troiani (2004) treats accent in Huehuetla Totonac as lexical, given minimal pairs such as ˈkuku 'uncle' and kuˈku 'sand' (p. 49). Nevertheless, there are some general tendencies: every lexical root has an accent. In the verb, suffixation causes alternations in the stress pattern, such that stress is on the final syllable if it ends in m, n, y, l, w; otherwise it is on the prefinal syllable. Troiani notes that accent in nouns requires further study. Stress is realized as intensity and higher pitch, and sometimes as a slight lengthening of the vowel.

5.3.2.4. Misantla Totonac

MacKay (1994, 1999) and MacKay and Treschsel (2005) are studies of Misantla Totonac. The sources treat nominal stress and verb stress separately.

There are two degrees of stress in Misantla Totonac. Secondary stress is attracted to heavy syllables, which are syllables with a branching rhyme, either a long vowel or a vowel with a following consonant. Primary stress falls on either the final or penultimate syllable (MacKay 1999: 73). Phonetically, primary stress is stronger than other stresses, characterized by longer duration and greater loudness.

Primary stress has the word as its domain, with clitics not affected; clitics themselves are stressed and do not affect the placement of primary stress.

In nominals, stress falls on the penultimate syllable when the word-final syllable is light, and is attracted to a word-final heavy syllable. The examples (28–9) are taken from MacKay (1999: 74).

(28)	min-paa-luu	[mímpáalúu]	'your intestines'
	łukuk	[łukúk]	'pierced'

However, word-final syllables closed by a coronal obstruent (t, s, ʃ, ł) do not receive primary stress, as shown in (29):

(29) mukskut [múkskut] 'fire'
kutʃiɬ [kútʃiɬ] 'knife'

In general, final syllables with a long vowel are stressed even if they are closed by a coronal obstruent, although there are some exceptions.

MacKay also proposes some instances of lexical stress, with some stressed CVC syllables ending in a voiceless coronal. In other Totonac varieties, these words are vowel-final, with the final vowel lost in Misantla Totonac.

In verbs, primary stress falls on the final syllable regardless of its weight. Word-final inflectional suffixes are never stressed in word-final position. There are various complications with suffixed forms, for which MacKay introduces a type of lexical extrametricality.

5.3.2.5. Filomeno Mata Totonac

McFarland (2009) argues that the regular stress pattern proposed by MacKay, although it is often found in Filomeno Mata Totonac (examples in (30)), does not always apply (examples in (31)). Note that final voiceless vowels as in the last two examples of (30) (called latent vowels by McFarland) do not count for the purposes of stress. On the other hand, the last example in (31) is considered to have a final sonorant-closed syllable. McFarland notes that forms with unpredictable stress occur in 25% of the monomorphemic items in her nominal database. Stress both fails to occur on final sonorant-closed syllables, and is found on final syllables that do not meet the conditions for stress. The following examples are taken from MacFarland (2009: 52–54):

(30) tsíisa 'morning'
súwaɬ 'black sapote fruit'
tʃíkítʃ'i̥ 'type of plant'
ɬtantál'ḁ 'naked'

(31) ʃtíilan 'chicken'
tʃaalí 'tomorrow'

Since counterexamples are numerous, McFarland concludes that stress is lexical in Filomeno Mata Totonac.

McFarland notes several cases of what she terms morphological stress, or stress assigned by a suffix, as well as special stress patterns in compounds and ideophonic constructions. She argues that morphological

stress is associated with what she calls constructions, and not with the phonological surfacing of an affix. The stress rules are computed based on the underlying presence of suffixes, some of which do not appear on the surface. For instance, the imperfective aspect construction has final stress whether the imperfective suffix -aa is present or deleted (page 53). To give a few examples, the progressive aspect forms a construction that is associated with stress on the penultimate underlying syllable, as in (32) and (33).

(32) /paati-nan-maa/ [patináma] 'he is suffering'
suffer-HAB-PROG

(33) /ʃ-ta-ɬtata-maana-para/ [ʃtaɬtatamaanapá] 'you were listening
PAST-hear2-PROG2-THERE2-2SUB.sg over there'

To complicate matters, the second person allomorph of the progressive *-paa* is always followed by the second person singular suffix *-t̥i̥*. This suffix assigns stress to the syllable preceding *paa*.

(34) /taaskux-paa-t̥i̥/ [taaskúxpaat^{h}i̥] 'you are working'
work-PROG2-2SUB.sg

In compounds, stress falls on the final syllable of the penult member of the compound. Sound symbolic adverbs are reduplicated forms, and take primary stress on each syllable of the reduplicant.

Spanish borrowings tend to have penultimate stress, regardless of where stress is found in Spanish, although some have final stress (kapé < café).

(35) buréko borrego 'sheep'
puusikúlan saecula 'century' (Latin saecula; puu = LOC)

Overall, there is a single stress per word which falls within a three-syllable window at its right edge, the exact position being lexically determined in non-derived words and determined by the rightmost stress-choosing suffix in derived words.

5.3.2.6. Summary

Accent in Totonacan languages is of interest for several reasons. First, there are category differences in stress patterns, with different patterns in nouns and verbs as well as in the onomatopoetic vocabulary in some of the languages. Second, there are construction-specific stress patterns.

Third, in Huehuetla Tepehua, consonant-closed syllables attract primary stress, while lexical long vowels do not, a pattern that has been claimed to not exist.

5.4. Tequistlatecan

Tequistlatecan, also known as Chontal of Oaxaca, has two surviving varieties, Highland Chontal, with 3600 speakers, and Lowland Chontal (also known as Huamelultec, Campbell 1997), with only 950 speakers (Lewis 2009, Ethnologue). There is relatively little documentation available for these languages (see O'Connor 2007 and Maddieson, Avelino, and O'Connor 2009 for discussion), and there is little discussion of the stress system in the literature.

5.4.1. Highland Chontal

Highland Chontal, as discussed by Turner (1966, 1967), has a single primary stress per word. This syllable is longer than unstressed syllables.

Turner (1966) states that stress falls on the penultimate syllable of the word unless it is displaced to the final syllable because of its position in the sentence. In his 1967 work, he further indicates that word stress is complex, with grammatical-phonological interactions also playing a role. He notes that pluralization can be indicated by a stress shift: *lenála* 'the squash stem', *lenalá* 'the squash stems.' Turner also comments on clausal stress, manifested as loudness on the final word.

5.4.2. Lowland Chontal

Waterhouse and Morrison (1950) make brief comments about stress in Lowland Chontal, remarking that it is phonemic. They cite pairs such as *sánna* 'small crawfish' and *sanná* 'star' to support this analysis.

O'Connor (2007) provides a brief introduction to the phonology of Lowland Chantal. With respect to stress, she notes that vowel length is not phonemic but it occurs especially in penultimate stressed syllables (33).

Maddieson, Avelino, and O'Connor (2009) is a phonetic study with brief comments about stress. They note that there are five vowels (i e a o u), all of which show some allophonic lengthening, frequently in pretonic syllables.

5.5. Mayan

Mayan is a major language family, with 69 languages listed in Ethnologue. There are five major divisions, Cholan-Tzeltalan, Huastecan,

Kanjobalan-Chujean, Quichean-Mamean, and Yucatecan, each with a number of subdivisions. Three languages of the Mayan linguistic family have contrastive tone: Yucatec, Uspantec, and one dialect of Tzotzil (San Bartolo Tzotzil), and there seems to be incipient tone developing in Mochó[9]. In all these languages the use of tone is restricted. All other Mayan languages are stress-accent languages without contrastive tone. In the following a number of stress systems in Mayan languages are discussed. In our classification of the Mayan languages we follow Campbell, Kaufman and Smith-Stark (1986).

One Mayan language is included in StressTyp.

Pokomchí; Poconchi [U]

Mayan, Quichean-Mamean, Greater Quichean, Pocom. North Central Guatemala.

- Stress falls on the final syllable.

ʔeˈtal ‘to signal’ ʔauˈas ‘older brother’ niˈnaa ‘my head’

5.5.1. Huastecan

Huastec is a Mayan language spoken in a small area of southeastern San Luis Potosí and northern Veracruz, Mexico. With the now extinct Chicomuceltec, it forms the Huestecan branch of the Mayan linguistic family. According to Edmonson (1988), stress in Huastec falls on the rightmost long vowel of the word or, if there is no long vowel, on the leftmost vowel (see also Larsen and E. Pike 1949).

The language has no secondary stresses, except for a single case in which primary stress is reduced to secondary stress in words derived with the compound suffix /-talaab/, which forms unpossessed abstractive nouns and seems to act as an independent phonological word: /wálab/ ‘sin’ ∼ /wàlabtaláab/ ‘sinfulness’. Some suffixes may trigger changes in the stress pattern. Unstressed syllables show a tendency towards centralization.

A similar analysis of Huastec is proposed in Herrera (2010), who provides the following examples (observe the lengthening of the stressed vowel in the adaptation of loans from Spanish (36h–i)):

9. Lyle Campbell, personal communication.

(36) Huastec (Herrera 2010: 3)

(a)	tá.mu	'I have met him'
(b)	kí.θib	'arena'
(c)	pák.laθ	'bent'
(d)	pa.t'áal	'iron'
(e)	láab.lij	'to bless'
(f)	tek'θáal	'to cook'
(g)	pa.lu.lúul	'very soft'
(h)	léetsa (<Sp. leche [létʃe])	'milk'
(i)	lanáaʃ (<Sp naranja [naránxa])	'orange'

As the examples in (36) show, primary stress is on the leftmost syllable, unless the word contains a long vowel, in which case the long vowel attracts stress. Syllables closed by a consonant are not considered heavy for the purposes of stress. Herrera agrees with Edmonson (1988) that there are no secondary stresses in Huastec.

5.5.2. Yucatecan

Yucatec Maya is spoken in the Yucatán Peninsula, northern Belize, and parts of Guatemala. Together with Lacondón, Mopán, and Itzá, Yucatec forms the Yucatecan branch of the Mayan linguistic family. The number of Yucatec Maya speakers is estimated between 800,000 and 1.2 million, for most of whom the native language remains their first language. In Yucatec Maya, syllables can have short and long vowels, which, following Gussenhoven and Teeuwen (2008), we will refer to as short and long syllables. Long syllables come in three types from the point of view of word prosody. In (37) below the long syllable types are contrasted with each other and with the short syllable.

(37) Gussenhoven and Teeuwen (2008). Examples from Pike (1946)

Short	ʔek	'wasp'
Long High	kóot	'wall'
Long Low	ʔaak	'turtle'
Glottalized	ku'uk	'squirrel'

According to Gussenhoven and Teeuwen, "There are no reliable statements on the word stress in the language [...] our tonal analysis suggests

that the prosodic syllable types listed [...] are stressed syllables". The argument the authors provide for their hypothesis is that tone is contrastive only in long syllables and word-initial short syllables. This hypothesis may also explain why long syllables are rarely adjacent in the same word. It should be observed that, if contrastive tone is on the stressed syllable, the stress rule for Yucatec Maya looks identical to the one just seen for Huastec, which has no contrastive tone. Gussenhoven and Teeuwen propose the following account of surface tones in stressed syllables:

(38) Analysis of Yucatec Maya stressed syllables (Gussenhoven and Teeuwen 2008)

Long High	originates from a lexical H-tone, which becomes linked to the syllable
Long Low	receives a default L-Tone
Glottalized	originates from a lexical H-tone linked to the first mora
Short	receives a default L-tone

Unstressed syllables, i.e. accentless words such as function words and non-initial short syllables, fall outside the association domain for lexical tones and acquire no default tones themselves, except for an inserted L-tone, which appears at the sentence level on a toneless mora or syllable between H-tones.

A different account of Yucatec Maya tone is proposed by Frazier (2009a, 2009b), who observes that, whereas the pitch contour of high tone vowels is variable depending on the context, the pitch contour of glottalized vowels is always falling. As an explanation of this behaviour Frazier suggests that the mora can bear glottalization features in addition to tonal features and that in Yucatec Maya tone cannot be moved to a mora that bears glottalization features. This hypothesis clears the way for an account in which the mora is the only tone bearing unit in all long syllables, as described below:

(39) Analysis of Yucatec Maya stressed syllables (Frazier 2009a)

$\grave{\mu}\ \mu$	$\acute{\mu}\ \mu$	$\acute{\mu}\ \underset{\sim}{\mu}$
$\vee$	$\vee$	$\vee$
V	V	V
low tone	high tone	glottalized

In Itzaj Maya, another language of the Yucatecan branch, stress generally falls on the first syllable of the root as well as on alternate syllables. In addition, stress falls on long syllables (defined as VV or V?[10]), wherever they occur. Phrasal stress is on the last syllable of the phrase and supersedes word-level stress (compare *winik* 'man' in the sequences (40a–c)). In the examples below, we have marked the phrase-final stress with an acute accent, all other stresses with a grave accent; brackets (added by the authors of this chapter) indicate foot structure.

(40) Itzaj Maya (Hofling 2000: 6–8; foot structure added by ourselves)

a.	(à?) (wì.nik)(-é?) DET man-TOP	'the man'
b.	winík	'man'
c.	(nùk-uch) (wìnik)(-óo?) great-ADJ man-PL	'great men'
d.	(à?) (nùk-uch) (wìnik)-(òo?)-(é?) DET great-ADJ man-PL-TOP	'the great men'

As we have tried to express by the brackets in the examples above, the basic stress system of Itzaj appears to follow a left-to-right moraic trochee rhythm, with the primary stress rule (rightmost syllable) applying at the phrasal level. Only long vowels and V? sequences are bimoraic. Some variations to this basic structure may be heard. For example, a stress may be optionally suppressed before a stress, such that [à?wì.niké?] 'the man' may also be pronounced [a?wì.niké?], without initial stress.

5.5.3. Mamean

The language Mam is spoken in the northwestern highlands of Guatemala. It belongs to the Mamean subbranch of the Eastern Mayan languages, along with Teco, Ixil, and Aguacatec. The main stress system of Mam is described by England (1983: 37) as predictable in accordance with the following rules: stress falls on a long vowel in the word (41a–b); if there is no long vowel, stress falls on the vowel preceding the last glottal

10. The fact that both [VV] and [V?] define a bimoraic sequence, but not [VC], where C is a non-glottal stop, suggests a phonological analysis of [V?] as /VV$^{?}$/, where the superscript glottal stop defines a distinctive laryngeal property of the long vowel, rather than an independent glottal consonant (compare Frazier's analysis of glottalized vowels in Yucatec Maya).

stop in the word (41c); if there is no long vowel and no postvocalic glottal stop, stress falls on the vowel preceding the last consonant in the root (41d–e). In the dialect of Mam studied by England, spoken in the town of San Ildefonso Ixtahuacán in the department of Huehuetenango, there is a constraint against more than one long vowel per word.

(41) Mam (England, 1983: 37–38)

a.	/aqˈuuntl/	[ʔaqʃúːntl]	'work'
b.	/waqˈnaaya/	[waqʃnáˆːyə]	'I worked'
c.	/puʔlaʔ/	[pʊʔláʔ]	'dipper'
d.	/spikyˈa/	[spíkʸʔə]	'clear'
e.	/xpichaqˈ/	[š;pɪčáqʃ]	'raccoon'

In Mam, short unstressed vowels are neutralized to [ə] after a stressed vowel (cf. 41b/d) or (less frequently) are deleted. When a suffix with a long vowel is added to a stem with a long vowel, either the long vowel of the stem or the one in the suffix is shortened, conditioned by morphological factors. There is also a constraint against glottal stops following short vowels in words with a long vowel. As we have also seen in Itzaj Maya, in Mam long vowels as well as sequences of a short vowel plus a glottal stop act as stress attractors, in keeping with the prominence scale /VV/ > /Vʔ/. This fact, as well as their natural class behaviour as regards the ban against their co-occurrence inside words, points to an analysis of /Vʔ/ as /VVˀ/.

Hyman (2006: 239–40) also discusses Mam, with specific reference to the long vowel constraint, which stipulates that only one long vowel is allowed per word and that the presence of a long vowel disallows the presence of a glottalized vowel in the same word. According to Willard (2004: 41), a suffix may be dominant or recessive, independent of whether it has a long or short vowel itself, as is illustrated below:

(42) Dominant/recessive vowel length in Mam

a. recessive short suffix	/ooq'-b'il/	ooq'-b'il	'sth. that causes crying'
b. recessive long suffix	/b'iitz-oo-/	b'iitz-a-	'sing'
c. dominant short suffix	/q'ooj-le̲'n/	q'oj-le'n	'state of fighting'
d. dominant long suffix	/liich'-ich'i̲in/	lich'-ich'iin	'breakable'

When a suffix is recessive (42a, b), length is preserved on the preceding root. If both the recessive suffix and the root have a long vowel, as in

(42b), only root length is preserved but when a suffix is dominant, as in (42c, d), the root vowel ends up short. Hyman notes that while the shortening seen in (42d) can also be attributed to culminativity, that in (42c) it cannot be: the dominant short-vowel suffix imposes a short vowel on the root as well. If the sequence V glottal stop is analyzed as having a long vowel, as suggested above, then the suffix in (42c) is a dominant long suffix.

Another Mamean language, Aguacateco [L/L], has stress on the last long vowel, or on the last syllable in case there are no long vowels (McArthur and McArthur (1956).

5.5.4. Quichean

Tzutujil belongs to the Quichean subbranch of the Eastern Mayan languages, along with Quiché, Sacapultec, Cakchikel, and Sipacapeño. The language has about 50,000 speakers, who live in midwestern Guatemala, in an area that extends from the highlands on the southern and western ends of lake Atotlán to the lowlands on the southern Pacific coastal plain. Stress in Tzutujil native vocabulary is always on the last syllable (43a–b). The only exception is the 'connecting' vowel, which is suffixed to monosyllabic adjectives that function as modifiers when preceding their head noun. The connecting vowel is always unstressed.

(43) Tzutujil (Dayley 1985: 29–30)

a.	aachi	[a:čí]	'man'
b.	achajiloom	[ačaxɪló:mm̥]	'husband'
c.	bˈáaka (Sp. vaca)	[ɓáaka̰]	'cow'
d.	serbˈ íisyo (Sp. servicio)	[sɛrɛɓí:syo̰]	'service'
e.	bˈyáaja (Sp. viaje)	[ɓyá:xa̰]	'trip'
f.	kape (Sp. café)	[kapɛ́]	'coffee'
g.	lugaar (Sp. lugar)	[lʊgá:r̥]	'place'

Stress in loans from Spanish is not predictable, but appears to keep the position it occupies in Spanish words (32c–g), at least in the examples provided by Dayley.

In Quiché, stress falls on the final syllable (Mayers 1966).

5.5.6. Kanjobalan

The Tojolabal live in Chiapas, Mexico. Their language belongs to the 'Kanjobalan proper' subbranch of Western Maya. In Tojolabal (Furbee-

Losee 1976: 184–185), main stress is on the first vowel of the root, except, again, in Spanish loans. Moreover, at the phrasal level, the last syllable is always stressed, which produces alternations in the position of stress: /činil/ 'early childhood' is realized as [čínil] phrase-initially/medially, but as [číníl] phrase finally. When two primary stresses arise in sequence, the first one is reduced to a secondary stress. A similar stress pattern is described by Day (1973) for Jacalteco.

5.5.7. Cholan-Tzeltalan

The situation described for Tojolabal compares with the one described by Haviland (1981) for the language Tzotzil, a member of the Tzeltolan sub-branch of the Cholan-Tzeltalan branch, spoken by around 300,00 speakers in the state of Chiapas, Mexico. According to Haviland (1981), primary stress falls on the leftmost syllable of the root. An even stronger stress is on the final syllable of a phrase or utterance (as before, in the words below, the grave accent marks word-level primary stress, whereas the acute accent marks the stronger phrase-final stress):

(44) Tzotzil (Haviland 1981: 14)

a.	jvàbajóm	'musician'
b.	li jvàbajomé	'the musician'
c.	chtàl li jvàbajomé	'the musician arrives'
d.	ʔali jvàbajomé, chtàl xá	'the musician arrives already'

The language Tzeltal is closely related to Tzotzil and seems to have a very similar pattern. According to Gerdel (1974) the stress is 'stress-group final'. Secondary stress on the first syllable in stress groups of three syllables.[11]

5.6. Misumalpan

The Misumalpan family of Nigeragua contains Mískito (with 145,000 speakers), Sumo (with 7000 speakers) and the extinct Matagalpa and Cacaopera. StressTyp contains an entry for Miskito, which has initial stress:

11. See also John Haviland, Stuart Robinson & Esteban Gutierrez. An On-line Tzotzil Grammar: http://www.cerf.net/esteban/Tzotzil/

Mískito [I]

Misumalpan. Nicaragua, Honduras.
- Stress falls on the first syllable of the word.

ˈwal ‘two’ ˈutla ‘house’ ˈlawana ‘song’

5.7. Language isolates

A number of isolates are reported for this area:

(45) Extant isolates: Tol, Seri, Huave, Tarascan (P’urhépecha), Xincan
Extinct isolates: Cuitlatec, Naolan, Maratiton, Guaicurian (a family), Alagïlac

Several of these have entries in StressTyp. Here we provide information about the extant isolates only.

5.7.1. Tol

Tol; Jicaque [U/P]

Language Isolate. Honduras, with about 350 speakers.
- Stress is usually final if the last syllable is closed, otherwise stress is penultimate.

ˈbele	‘he talks’	naˈcʔom	‘my wife’
naŋkuˈpwepe	‘left’	phesˈmas	‘skunk’

5.7.2. Seri

Seri [F/F]

Hokan, Salinan-Seri. Mexico, Gulf of California. 900 speakers
- Stress falls on the first complex nucleus of the root, else on the first.
- Other complex nuclei bear secondary stress.

ˈxpeyo ‘sailfish’ xaˈpo: ‘sea lion’ laˈχi:ktim placename

In Marlett (2008), a different analysis is presented of stress in Seri. This analysis places stress on the final syllable of the root if heavy, otherwise stress is on the penultimate syllable of the root; here, a final VC counts as light. This system then is not unbounded in this analysis. Long vowels and diphthongs only occur contrastively in stressed syllables. This, we take it, implies that such units only occur in the final or prefinal root syllable.

There is a bimoraic requirement for the minimal word (which excludes non-major class words). The following examples support the right edge QS analysis:

(46)	ʔɛ́ʔɛ	'plant'	táʃo	'one'
	ʔákat	'shark'	áʃox	'star'
	kákni	'wood ibis'	ʔasła	'Pacific calico scallop'
	kópɬim	'nighthawk'	koṕtox	'a century plant'
	ʔaːko	'house'	sɛ́ːnɛ	'kindling wood'
	móːχon	'spotted scorpion fish'	sɛ́ːnɛl	'butterfly'
	komína	'Coulter bickel bush'	moχíma	'yesterday'
	kanókni	(Heermann's Gull)'	toʃípła	'side-blotched lizard'
	kamíʃxix	'a venus clam'	ʃakápnix	'ball of dirt or fruit'
	komáːnaɬ	'yerba mansa'	ʔamíːmɛ	'sky'
	takaʃáka	'inchworm'	kaskamána	'an unidentified stinkbug'

The calculation of the heaviness of the final syllable is dependent on consonant extrametricality.

(47)	final VV:	ʔataɬʔáː	'to buy'
		χomkaʔái	'an unidentified small round flounder'
	final VVC	kokáːk	'Seri people'
		χomkaʔóix	'a cholla-like cactus'
		saʔméːs	'orange (fruit)'
	final VCC	moχʔámt	'last year'
		sapátx	'sweetbush'

Marlett notes a number of roots that must be analyzed with an extra-metrical root final syllable:

(48)	káːmopχa	'white-lined sphinx moth'
	sóːkaxam	'winged pearl oyster'
	kótotax	'boojum tree'
	ʔásotox	'a grunt'

Examples like the first two in (48) might suggest "that stress may occur even farther to the left because of the long vowel", and this may have prompted the earlier unbounded analysis. However, the remaining examples in (48) suggest that syllable extrametricality is independently motivated in the system.

There are, furthermore, exceptions to consonant extrametricality:

(49) ʔamák 'fire' imoʃít 'its half'

Finally, Marlett mentions examples that fail to have final stress despite the fact that the final syllable ends in two consonants.

(50) χníkatɬ '(Colorado snapper)'
jasámikt 'its tail (of the black sea turtle)'

Further complications exist in this system and we refer to Marlett (2008) for additional discussion.

5.7.3. Huave

The 12,000 Huave live in Eastern central Mexico. Kim (2008: 35) reports that "[m]uch of Huave prosody is as yet uninvestigated." Stress appears to be final and there is no clear evidence for secondary stress or syllable weight distinctions. Other work on Huave can be found in Noyer (1991) and Evanini (2007).

5.7.4. Tarascan

For Tarascan, the Ethnologue distinguishes the languages Purepecha (40,000 speakers) and Western Highland Purepecha (145,000 speakers).

Purépecha; Tarasco; Tarascan [I;S]

Language Isolate. Michoacán (Mexico).
• Stress is initial or on the second syllable.

ˈpatani 'to extinguish the fire' kaˈrani 'to write'
xaˈpotʃʰaakani 'I will wash my head'

We find a different description in Friedrich (1984: 78–79). Stress is final in roots, which are mostly disyllabic. After the 'main stress' there is an alternating pattern of secondary stresses. Final unstressed vowels devoice before pause and final unstressed /i/ and /ɨ/ are deleted before coronal consonants and 'open juncture' or pause. Also, final root vowels or 'theme vowels' are dropped before conjugational endings. In the general descrip-

tion of the phonology we notice examples such as téeksa- 'stumble' (p. 79), tpéri 'fallow land' (77), which suggest that stress is not always root final.

5.7.5. Xincan, Lencan

Xincan is a small family of Guatemala that consists of four languages, all of which are extinct or near extinction. Campbell (1997: 166) notes that stress falls on the vowel preceding the last consonant, or __C(V)#.

Lencan is a family consisting of two languages, Salvadorian Lenca and Honduran Lenca. Both languages are extinct (Campbell 1976).

Campbell (1976: 78), based on work with one speaker of Salvadorian Lenca, notes that stress is generally on the penultimate syllable, with some exceptions.

5.8. Southern Uto-Aztecan

In the remaining sections we turn to the language families the languages of which are not entirely spoken within Middle America, beginning with Uto-Aztecan languages. Most of these languages are found in the United States, but the Southern branch of the Uto-Aztecan family has representatives in Middle America, specifically in Mexico.

5.8.1. Pimic: Tepehuan

Southeastern Tepehuan is represented in StressTyp.

Tepehuan, Southeastern (dialect of Tepehuan) [I/I] S-E Tepehuan
11,000 speakers

Uto-Aztecan, Southern Uto-Aztecan, Sonoran, Tepiman, Southern Tepehuan. Chihuahua, Durango, Nayarit, Sonoro, Jalisco (Mexico).

- Primary stress occurs on the second syllable of the stem if it contains a long vowel and the first does not. In all other cases, stress is initial.
- Secondary stresses on alternate syllables, respecting vowel length.
- Prefixes do not count for stress assignment.

ˈvaavaʃ	'pheasant'	haˈhooñiʔ	'wives'
hir koˈmaarak	'it is wide'	hir ˈkooʔkmarak	'they are wide'

5.8.2. Taracahitic: Mayo

The almost 40,000 or so speakers of Mayo live in the Mexican states of Sinaloa and Sonora. In Mayo, high tone is restricted to occurring on either

the first or second syllable of a word (Hagberg 2006). Toneless syllables are L when they occur between the last H and pause, otherwise they are M. The location of the H is usually a lexical property of roots:

(51) a. Initial syllable H

chúpnake	'will harvest' (tr.)
hí-chupnake	'will harvest' (intr.)
hí-hi-chupnake	'will always harvest (intr.)

b. 2nd syllable H

ponnáke	'will play' (tr.)
hi-pónnake	'will play' (intr.)
hi-hí-ponnake	'will always play' (intr.)

In both types, the H tone moves to the left when prefixes are present. While other Uto-Aztecan languages assign stress from the left edge of the word, Hagberg analyzes Mayo with a floating H tone whose placement is determined by roots: "While most theories allow for lexically contrastive stress, they do not allow lexical accent to float, and yet this is clearly what happens. Since floating tone is incontrovertibly attested in a number of other languages, I conclude that Mayo has underlying autosegmental tone, not accent." (p. 7).

5.8.3. Corachol-Aztecan

5.8.3.1. Huichol

The 20,000 speakers of Huichol live in Northeast Nayarit and northwest Jalisco, Mexico. According to Iturrioz (1999), the default position for stress in Huichol is the penultimate syllable, but some words have final or antepenultimate stress. Inflectional suffixes are always unstressed (even those consisting of two syllables) as a result of which in words with inflectional suffixes, the accent may be located further from the right edge then described by the rules above.

5.8.2.2. Nahuatl

The Nahuatl family forms the southernmost representative of the Uto-Aztecan stock and, with one and a half million speakers, it has the greatest number of speakers of all the indigenous languages of Mexico.

Tetelcingo Nahuatl is listed in StressTyp.

Nahuatl, Tetelcingo [P]

Uto-Aztecan, Southern Uto-Aztecan, Aztecan, Gen. Aztec, Aztec.
Tetelcingo (Mexico).

- Stress occurs on the penultimate syllable.
- Otherwise stress falls on the first syllable in verbs and the second in nouns.

ˈkaktli ‘sandal’ kaˈlaki ‘enter’

aˈyohtli ‘squash’

Nahuatl has many dialects in which, most of the time, stress occurs on the penultimate syllable of the derived word, with inflectional morphemes being stress-neutral (Andrews 2003).

According to Canger (2000), the penultimate stress accent, which is predictable in most other dialects of Nahuatl is less stable/predictable in the Durango variety of Nahuatl, where both final and antepenultimate stress occur in addition to the default penultimate stress:

(52) kinán titóh? ‘What is your name?’
itokáloha ‘they may be named’
káskara ‘shell’

Morphology also plays a limited role. Thus, for example, verbs appear to have stem-final stress in the plural of certain tenses, while the penultimate syllable of the stem is stressed in the singular:

(53) ki-tása ‘he throws’
ki-tasál ‘they throw’

Also, some suffixes attract stress, such as, for example, the imperfect suffix:

(54) ki-tasa-l-á ‘he threw’

Canger’s discussion of adverbs, however, implies that there is some sensitivity to weight, since “they are stressed according to a general rule assigning ultimate stress to those ending in a consonant and penultimate stress to those ending in a vowel” (p. 377):

(55) áso ‘maybe’
demás ‘too’

Also, according to Canger, nouns may be diacritically marked for stress.

Guion et al (2009) examine Balsas Nahuatl and Ahuelican Nahuatl, arguing that a mixed stress accent/tone system developed when an F0 contour specification over syllables with breathy codas (co-articulation effect) was reanalyzed as a phonological tonal specification. According to these authors, the two dialects of Nahuatl they have examined are the only ones that have developed tone in addition to a stress accent.

According to Robinson (1969) Puebla Nahuatl has contrastive stress, realized as higher pitch and greater duration. He distinguishes "primary, secondary, and tertiary accent" but it seems that his "secondary" and "primary" accents correspond to phrase- and clause-level accents instead of accents within a single word. The default placement of accent in the prosodic word is penultimate. Most cases of suffixation causes the accent to shift to the right, as expected. There are some suffixes, however, whose presence does not cause accent shift, resulting in an antepenulitmate pattern.

5.8.2.2.2. Pipil

The almost extinct Pipil language is spoken in El Salvador (and originally also in Honduras). According to Campbell (1985), Pipil has predictable penultimate stress with some dialects having final accent due to syncope of penultimate high vowels in certain environments. Spanish loanwords can have differing patterns.

5.9. Chibchan

The Chibchan languages are found from Honduras in Central America to Colombia and Venezuela in South America. In this section, we focus on the Chibchan languages of Honduras, Costa Rica, Nicaragua, and Panama.

Quesada (2007), based on work by Constenla (1989, 1991, 1995), proposes the following organization of the Chibchan languages. Paya (Honduras, also called Pech) constitutes a branch of its own, distinguished from one other group, the Southern languages. The Southern languages divide into three subgroups, Pota and Isthmian, of interest here, and Magdalenian (languages of South America). Pota has two languages, Rama (Nicaragua) and Guatuso (Costa Rica; also called Meléku Jaíka), Isthmus divides into several groups: Viceita, consisting of Bribri (Costa Rica) and Cabécar (Costa Rica), Teribe (Costa Rica, Panama; also called Naso), Boruca (Costa Rica; also called Brunca), Guaymian, consisting of Guaymí (Costa Rica, Panama; also called Ngäbére, Movere, Move), and Bocotá (Costa

Rica, Panama; also called Buglere), Doracic, with the extinct Chánguena and Dorasque, and Cuna (Panama, Columbia; also spelled Kuna). This classification is somewhat different from the one in Ethnologue (Lewis 2009).

Constenla (1981) reconstructs the sound system of Proto-Chibchan, proposing three suprasegmentals, stress, tone, and nasalization. Constenla proposes that stress was lexical. Several of the languages exhibit tone contrasts, which leads Constenla to reconstruct high and low tones for Proto-Chibchan. While nasalization is not under focus here, it is worthy of mention as it has prosodic properties.

According to Holt (1986, 1999), Paya has two tones, high and low, and perhaps an extra low tone. There is some tone assimilation. Holt suggests that there may be two levels of stress, primary and secondary. Stress is claimed to be predictable on the basis of underlyingly marked tone as well as from the position of thematic/stem syllables in longer forms. In verbs, primary stress is typically associated with the last syllable of the stem. Holt also observes that long vowels occur with full length only in stressed, open syllables; they are relatively short in closed and unstressed syllables.

The Pota languages, Rama and Guatuso, are non-tonal, as is Cuna, while the remainder of the Central American Chibchan languages are classified as tonal (Quesada 2007: 53). Some have only high and low tone (Paya, Boruca, Guaymí), whereas some others have additional tones (e.g., Bribri has four tones, high, low, rising, and falling).

While many of the Chibchan languages show reflexes of tone, in Teribe tone is marginal (Quesada 2000: 37, Oakes 2001: 8). High and low tones are found in some cases; for instance, tone occurs with colour terms, indicating colours that are not prototypical, as in *díŋdíŋ* 'blue' vs. *dìŋdìŋ* 'light blue'. Quesada claims that stress is phonological, i.e. predictable, but is affected by sentence stress and is marginal. Word stress generally falls on the first syllable, but exceptionally on the last syllable. Stress is dependent on tone and causes a slight lengthening of the vowel (Quesada (2000: 39)). Contrary to Quesada's findings, Oakes describes Teribe stress as unpredictable.

According to Quesada (2007: 54), in the Isthmian languages generally, the root-final syllable is stressed. Constenla (1981) traces this situation back to Proto-Chibchan, through the loss of final unstressed vowels.

Bribri and Cabécar, both tonal languages, have contrastive tone only on the final syllable, with preceding syllables being tonally neutral. Bribri

has four tones (high, low, rising, falling), while Cabécar has three tones (low, rising, falling; Constenla 1981). Pre-final syllables are also more limited in terms of vowel quality contrasts, and vowels are shorter and weaker (Costenla 1981). In addition, nasalization is contrastive only on the final vowel, and extends leftwards (Constenla 1985).

In Boruca, with two tones, high and low, valency alternations may be indicated by tone, as in the following pairs: *ahd.Rá* '(he) abandons' versus *áhd.ɾa* '(he) remains' and *ráhd.ɾa* '(he) goes out' versus *rahd.ɾá* '(he) takes out' (Quesada 2007: 54).

Margery (1996: 23) discusses the phonology of Bocatá de Chiriquí, described as having two suprasegmentals, nasalization and accent; he calls the language 'una lengua acentual'. Margery provides a number of minimal pairs for accent: *gúdɛ* 'eat' versus *gudé* 'feline'; *gí.ɾi* versus 'after' *gi.ɾí* 'scabies'; *bá* 'you (sp.usted)' versus *ba* 'form'.

Holmer (1946), in his discussion of Cuna as spoken on the San Blas coast of Panama, reports that syllable stress is even on all syllables except those with 'supershort' vowels. These occur in the last syllable of a stress unit of more than one syllable, and are generally syncopated (page 187).

6. Conclusions

The languages of Middle America exhibit many interesting properties with respect to accent.

We have seen that the root is the locus for stress in the Oto-Mangean languages. In this group, the number of syllables contained in the root varies among the different languages. In its largest expansion, the root counts two syllables. Main stress may be on the only root syllable available or, when the root consists of two syllables, on the first or the second syllable.

In many languages of this area, stressed syllables are heavy on the surface. In some cases, stress is attracted to heavy syllables, while in other cases syllables lengthen in response to stress, with either vowels or consonants becoming long. The majority of the Mixe-Zoquean languages have right-edge oriented stress, which is at least in part weight-sensitive. Similarly, main stress distribution is quantity-sensitive in the Totonacan languages, where it is moreover dependent on the lexical category, with different patterns in nouns and verbs in some languages. Stress falls on the final syllable when it is heavy (generally CVV or CV(V)C). Equally, in different ways in the different languages, stress is quantity-sensitive in

a number of the linguistic isolates, such as Seri, some of the Southern Uto-Aztecan languages, and Xincan. In Huehuetla Tepehua, syllables closed by a consonant attract primary stress, while lexical long vowels do not, a pattern that has been claimed to not exist. The lexical distinction between nouns and verbs is equally relevant for stress location in Tetelcingo Nahuatl.

In a number of the Middle American languages there is an interaction between tone and stress, with some clear cases of tone being limited to the stressed syllable, and some less clear cases of stress attracted to (one of) the high toned syllable(s). In some of the Mayan languages, stress is attracted to syllables containing long vowels (of which there is usually only one per stress domain), with the leftmost syllable as the location for default stress in words without a long vowel. Huastec, Mam (with some more complexities), and Yucatec Maya are examples, the latter showing moreover a tone opposition restricted to the stressed syllable. Some of the Middle American Chibchan languages, most of which make use of (some degree of) tone at the lexical level, are repeatedly analyzed as mixed systems with stress attracted to tone.

Finally, with Spanish being the official language of all the Middle-American nations, all the traditional languages have borrowed words from Spanish. This makes Middle America an interesting area for testing theories of loan phonology. As it turns out, the different native languages differ in their response to loanwords, with some of them maintaining the original Spanish stress patterns, others adapting the loans to the canonical stress patterns of their own language, and still others assigning stress to loanwords in a way that is different from both the native stress rules and the original Spanish stress.

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