

SIL-Mexico Branch Electronic Working Papers #010: Beginning Tone Analysis for Amatlán Zapotec

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Contents

1 Introduction	2
2 Background Information	2
3 Basic Tonal Contrasts	3
4 Tonal processes	6
4.1 Nouns with Pronoun Possessors	7
4.1.1 Level Roots	8
4.1.2 Rising Roots	9
4.1.3 High Roots	9
4.1.4 Falling Roots	10
4.2 Nouns with Noun Possessors	11
4.3 Verb Aspects	12
5 Conclusion	13
Abbreviations	14
References	15

1 Introduction

This is an initial analysis of the tones in Amatlán Zapotec, in particular of the first person singular possessor. Zapotec is part of the Otomanguean language family.

Amatlán Zapotec (hereafter **AZ**) tone appears to have simple, underlying contour tones with most remaining constant whether in isolation or in context. Since most tones may be discerned by context, there is no need to include them in the orthography. However, tone perturbation does exist, especially on words followed by **na**, the first person singular pronoun, such as the level root **xich** *uncle* becoming falling preceding **na**. In other cases, the pronoun itself changes rather than the preceding word, such as following the high root **ma** *animal* when the normally falling pronoun **na** changes to high.

2 Background Information

Amatlán Zapotec is spoken in San Cristóbal Amatlán, Miahuatlán District in the southern mountains of Oaxaca. There are approximately 10,000 speakers of the language. General language data has been collected by David and Sylvia Riggs over a number of years from many different speakers. The specific data used here was collected in early 2003 from three different speakers, two male and one female.

The following are the consonantal phonemes of **AZ**. There are voiced and voiceless pairs. The IPA equivalents are shown where they are different from the practical orthography .

(1)

	Bilabial	Dental	Alveolar	Alveopalatal	Palatal	Velar	Labiovelar
Stop	p b	t d (ð) ty (tʲ)				k g (ŋ)	kw (k ^w) gw (g ^w)
Affricate				ch (tʃ)			
Fricative			s z	x (ʃ) zh (ʒ)			
Nasal	m		n			ng (ŋ)	
Lateral			l				
Flap			r (ɾ)				
Approximant	w				y (j)		

There are five vowel positions in AZ. All of them can be modified through laryngealization. When laryngealized in slow speech there is also a glottal followed by a vowel echo [V²V]. This is written as VV in the practical orthography.¹

(2)

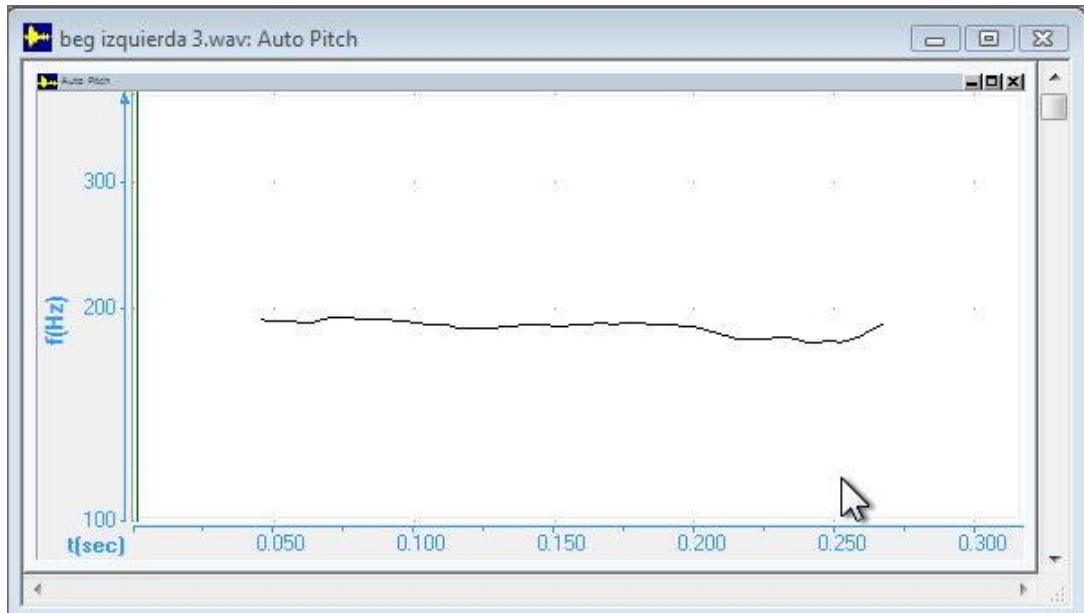
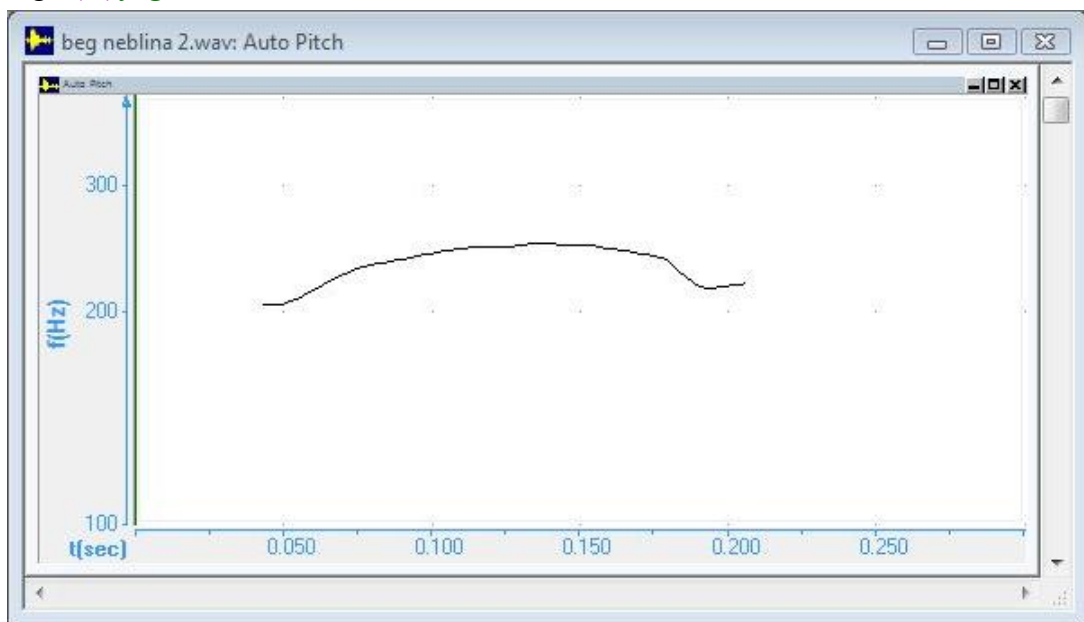
	Front	Back unrounded	Back rounded
High	i		u
Mid	e (ɛ)		o
Low		a	

The basic syllable structure is one to three consonants followed by a vowel (which can be laryngealized as noted above) followed by zero to two consonants: C⁺VC*. Words are principally mono-syllabic. Multi-syllable words are compounds, words with affixes, or loans. Stress on multi-syllabic words is principally iambic. All syllables may carry tone. Some words have historically syllabic consonants that also carry tone (which may or may not be considered syllabic now). This is demonstrated by the word **msi eagle** which has two falling tones, one on **m-** and the other on **-si** and is considered to be one syllable.

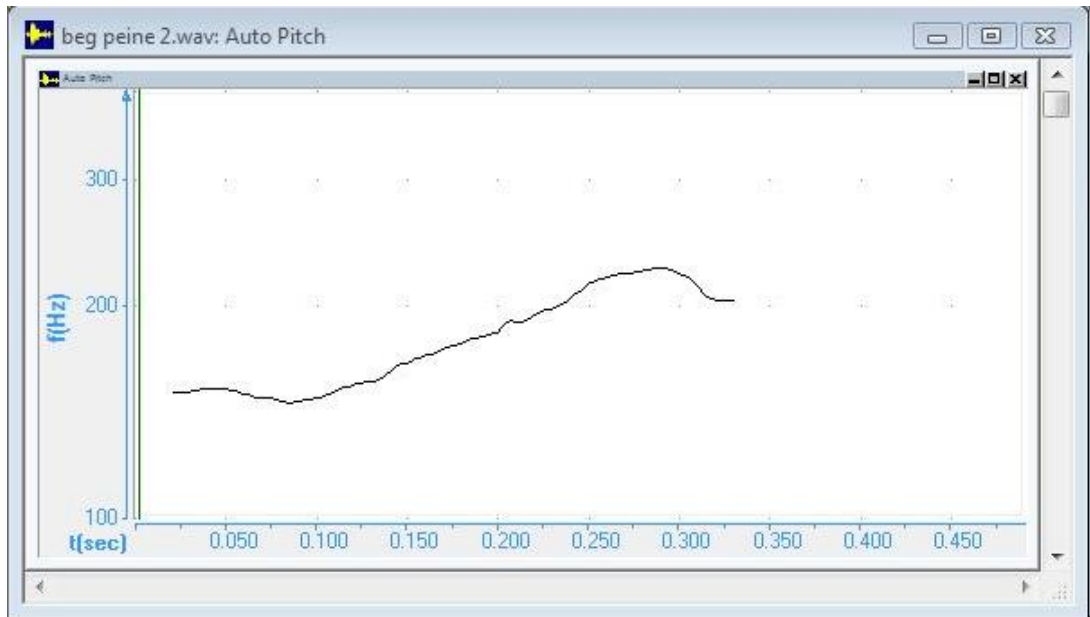
3 Basic Tonal Contrasts

Amatlán Zapotec has four contrastive underlying contour tones: level or low, high, rising, and falling. Tone is not normally indicated in the practical orthography. Example (3) demonstrates the contrast of all four tones for the combination **beg**. A smoothed pitch contour graph is also shown for each one.

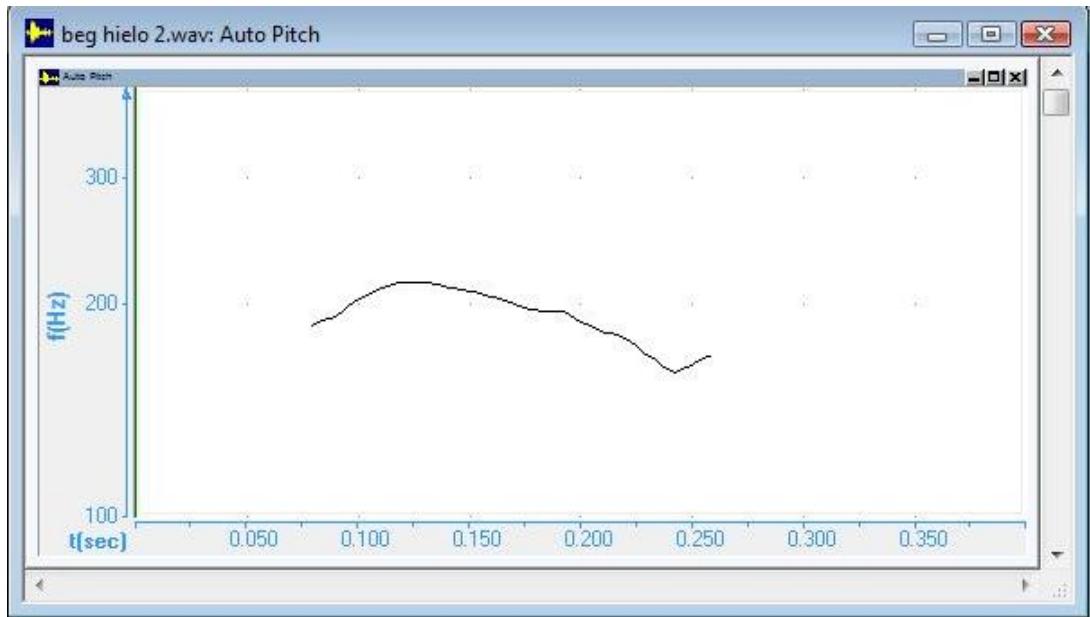
¹The information on consonants and vowels was taken from D.Riggs (1998).

(3) **beg**a. level or low (L) *left*b. high (H) *fog*

c. rising (LH) *comb*



d. falling (HL) *white (like ice)*



Some other words that have contrastive tone are shown in example (4). It shows the difference in meaning for each tone change.

(4)

	L	H	LH	HL
bad	<i>pod</i>	<i>taco</i>		
yin	<i>coffin</i>	<i>palm leaves</i>	<i>black wax</i>	
yet	<i>bend</i>		<i>wash</i>	<i>die</i>

	L	H	LH	HL
mzhin	honey		cockroach	deer
cho		separate	what?	body

Level or low tones are in the mid range of the voice and may typically have up to a 12% fall. Rising tones rise 25 to 44% in a sharp curve from the mid range up to, or beyond, the height of the high tones. High tones tend to begin 25% higher than the level tones and rise 15 to 25% with a gentle fall of 4 to 12%. Falling tones generally make a 12 to 30% fall from the mid range. There are a few words that fall and then rise again to the level where they started, especially phrase finally. There seems to be free variation with falling tones in the pronunciation of these words, so for the purpose of this study they are simply considered to be falling.

There are a few unordered constraints to take into consideration when looking at AZ tone.

- Tone is relative to the level of tone on the following word.
 1. When HL HL, the second HL is lower than the first and often starts where the L of the first word left off.
 2. When LL, the second L is the same or lower than the first.
 3. When HH, the second H is higher than the first.
 4. When LH HL, or LH H, the second word starts where the first one left off.
- Downdrift exists.
- The tone of the second word in a string may be anticipated on the first.
- A person's natural voice range may cause the following:
 1. A falling tone may appear level when the low limit is reached.
 2. When a falling tone follows a low tone, the fall is short.
 3. When a falling tone follows a high tone, the fall is more extensive.

4 Tonal processes

The first singular pronoun **na** (which functions as subject, object, or possessor) is HL in isolation and remains so when fronted in a frame, with or without the focus marker. This is illustrated in (5) and (6) where it is compared with the pronouns **lu** 2SG, **gu** 1PLEX, **me** 3F, **mad** child, and **ma** animal. The tone of the word in isolation is listed next to it in the header row. The tones of the word in the sentence are indicated in each column.

(5) **1SG fronted with focus marker**

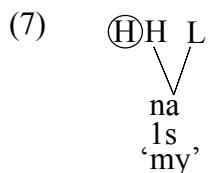
sentence	na HL	lu HL	gu H	me HL	mad L	ma H
Lee __ ngwa yi naaze. <i>FOC _ C-go mountain yesterday</i> __ went to the mountain yesterday.	HL	HL	H	HL	L	H
¿Lee __ chu ztoya lo xaa? <i>FOC _ Q FUT-sell-3IN to 3</i> Will __ sell it to him?	HL	HL	H	HL	L	H

sentence	na HL	lu HL	gu H	me HL	mad L	ma H
Lee __ kalab yech. <i>FOC</i> _ <i>PROG-read paper</i> __ am reading.	HL	HL	H	HL	L	H
Lee __ tubka nzhaw yat. <i>FOC</i> _ <i>always H-eat tortilla</i> __ always eat tortillas.	HL	HL	H	HL	L	H

(6) **1SG fronted without focus marker**

sentence	na HL	lu HL	gu H	me HL	mad L	ma H
__ ngwa yi naaze. _ <i>C-go mountain yesterday</i> __ went to the mountain yesterday.	HL	HL	H	HL	L	H
¿__ chu ztoya lo xaa? _ <i>Q FUT-sell-3IN to 3</i> Will __ sell it to him?	HL	HL	H	HL	L	H
__ kalab yech. _ <i>PROG-read paper</i> __ am reading.	HL	HL	H	HL	L	H
__ tubka nzhaw yat. _ <i>always H-eat tortilla</i> __ always eat tortillas.	HL	HL	H	HL	L	H

In many cases the high tone on **na** is higher than on other words with a falling tone. This makes it unique. Since high is a strong tone which doesn't seem to vary when it occurs as an underlying tone, it would appear that **na** carries a left high floating tone which causes perturbation to the left as well as on **na** itself. This is illustrated in example (7).



4.1 Nouns with Pronoun Possessors

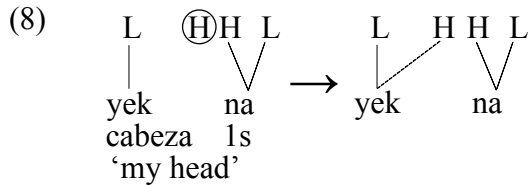
Noun possession in **AZ** occurs in two forms. Some words are inalienably possessed, such as body parts and familial relationships. The rest require a possessive prefix **x-**. Thus **re jug** becomes **xre me her jug**, and **yek head** becomes **yek me her head**. Inalienably possessed nouns do not take the prefix, even though it may be inherent in the root of some words, like **xey mad child's grandfather**, for example.

Tone is not altered in any way by the presence of the possessive prefix, nor is there tone sandhi on inalienably possessed nouns.

Following is the analysis of the tone sandhi that occurs when the first person singular **na** follows a noun as possessor.²

4.1.1 Level Roots

For roots with level (L) tones, (8) shows how the floating high tone on **na** attaches to the root with a level tone causing it to become rising. Examples are given in (9).



(9) Level Roots Examples

Level Roots	1SG HL	2SG HL	3F HL	3CH L	2PL H
xich <i>uncle</i>	LH HL xich na	L HL xich lu	L HL xich me	L L xich mad	L H xich gu
yek <i>head</i>	LH HL yek na	L HL yek lu	L HL yek me	L L yek mad	L H yek gu
xuz <i>father</i>	LH HL xuz na	L HL xuz lu	L HL xuz me	L L xuz mad	L H xuz gu
re <i>jug</i>	LH HL xre na	L HL xre lu	L HL xre me	L L xre mad	L H xre gu
rob <i>basket</i>	LH HL xrob na	L HL xrob lu	L HL xrob me	L L xrob mad	L H xrob gu

However, the floating high does not always attach to the noun and the low on **na** may or may not delink, as shown in the exceptions in (10).

(10) Level Roots Exceptions

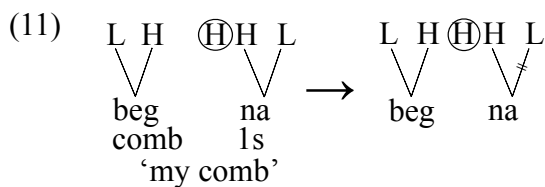
Level Roots	1SG HL	2SG HL	3F HL	3CH L	2PL H
mbyi <i>man</i>	L HL xmbyi na	L HL xmbyi lu	L HL xmbyi me	L L xmbyi mad	L H xmbyi gu
mzhin <i>honey</i>	L H xmzhin na	L L xmzhin lu	L HL xmzhin me	L L xmzhin mad	L H xmzhin gu

²Many thanks to Dr. Cheryl Black for her assistance in making this analysis during the Tone Analysis Workshop, held at the Jaime Torres Bodet Center in Mitla, Oaxaca, México during the month of June, 2003.

Level Roots	1SG HL	2SG HL	3F HL	3CH L	2PL H
lag <i>leaf</i>	L H xlag na	L L xlag lu	L HL xlag me	L L xlag mad	L H xlag gu
xnaa <i>mother</i>	L HL xnaa na	L L xnaa lu	L HL xnaa me	L L xnaa mad	L H xnaa gu

4.1.2 Rising Roots

For roots with a rising tone (LH), (11) shows how the floating high either merges with the previous high or just remains floating and the low on the first singular (normally) delinks, making **na** high. Examples are given in (12).

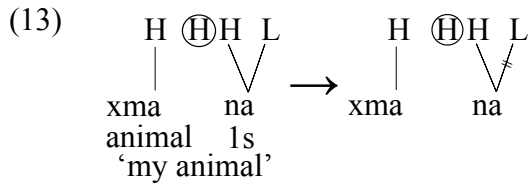


(12) **Rising Roots Examples**

Rising Roots	1SG HL	2SG HL	3F HL	3CH L	2PL H
bad <i>taco</i>	LH H xbad na	LH HL xbad lu	LH HL xbad me	LH L xbad mad	LH H xbad gu
wech <i>man's brother</i>	LH HL wech na	LH HL wech lu	LH HL wech me	LH L wech mad	LH H wech gu
luzh <i>tongue</i>	LH H luzh na	LH HL luzh lu	LH HL luzh me	LH L luzh mad	LH H luzh gu
beg <i>comb</i>	LH H xbeg na	LH HL xbeg lu	LH HL xbeg me	LH L xbeg mad	LH H xbeg gu
bal <i>woman's sister</i>	LH H bal na	LH HL bal lu	LH HL bal me	LH L bal mad	LH H bal gu
dob <i>maguey</i>	LH H xdob na	LH HL xdob lu	LH HL xdob me	LH L xdob mad	LH H xdob gu

4.1.3 High Roots

When the first singular pronoun **na** follows words with a high tone, the low of the falling tone delinks and the floating **H** tone either merges with the high of the previous word or simply remains floating, generating two high tones, as shown in (13). Examples are given in (14).

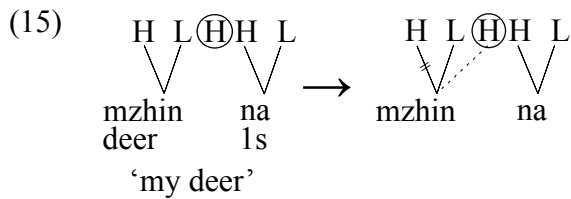


(14) **High Roots Examples**

High Roots	1SG HL	2SG HL	3F HL	3CH L	2PL H
ma <i>animal</i>	H H xma na	H HL xma lu	H HL xma me	H L xma mad	H H xma gu
ze <i>lard</i>	H H xze na	H HL xze lu	H HL xze me	H L xze mad	H H xze gu
mel <i>tortilla</i>	H H xmél na	H HL xmél lu	H HL xmél me	H L xmél mad	H H xmél gu

4.1.4 Falling Roots

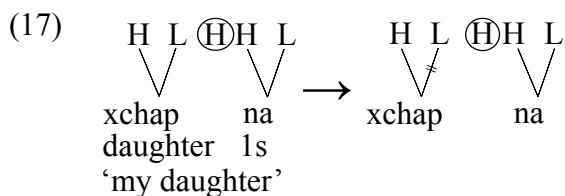
When the first singular pronoun **na** follows a noun with a falling tone (HL), one of two things will take place. In the first case, shown in (15), the floating high tone attaches to the end of the previous word, causing the initial high to delink, thus creating a rising tone. Then **na** retains its usual falling tone. Examples of this type are given in (16).



(16) **Falling Roots Type 1**

Falling Roots 1	1SG HL	2SG HL	3F HL	3CH L	2PL H
mzhin <i>deer</i>	LH HL xmzhin na	HL HL xmzhin lu	HL HL xmzhin me	HL L xmzhin mad	HL H xmzhin gu
xos <i>grandmother</i>	LH HL ³ xos na	HL HL xos lu	HL HL xos me	HL L xos mad	HL H xos gu
xey <i>grandfather</i>	LH HL xey na	HL HL xey lu	HL HL xey me	HL L xey mad	HL H xey gu
xkwes <i>side</i>	LH HL xkwes na	HL HL xkwes lu	HL HL xkwes me	HL L xkwes mad	HL H xkwes gu

In the second type of falling root, the low tone on the noun delinks and the floating high on **na** remains floating, yielding a high tone followed by a falling tone as shown in (17). Examples of this type are given in (18).

(18) **Falling Roots Type 2**

Falling Roots 2	1SG HL	2SG HL	3F HL	3CH L	2PL H
xchap <i>daughter</i>	H HL xchap na	HL HL xchap lu	HL HL xchap me	HL L xchap mad	HL H xchap gu
sa <i>spouse</i>	H HL sa na	HL HL sa lu	HL HL sa me	HL L sa mad	HL H sa gu
xuzh <i>son-in-law</i>	H HL xuzh na	HL HL xuzh lu	HL HL xuzh me	HL L xuzh mad	HL H xuzh gu

4.2 Nouns with Noun Possessors

Where two nouns occur together, the first as a possessed object and the second as possessor, the tone on the first noun changes to a **L** tone and the second retains its underlying tone. Regular possessed and inalienably possessed nouns perform the same way.

³There is speaker variation on this word. One didn't apply any rules (HL HL), another applied the rules of Falling Roots class 1 (LH HL), and another applied the rules of Falling Roots class 2 (H HL).

(19) **HL** **L** **L** **L**
xey + **mzin** → **xey** **mzin**
grandfather *mouse* *mouse's grandfather*

(20) **H** **LH** **L** **LH**
ngog + **mbew** → **ngog** **mbew**
dove *coyote* *coyote's dove*

In contrast, where two nouns follow a verb as the subject and the object, there is no tone perturbation.

(21) **L** **LH** **L** **L** **L** **LH**
nto **bich** **mzin** or **nto** **mzin** **bich**
H.sell cat mouse *H.sell mouse cat*
cat sells mouse *mouse sells cat*

(22) **LH** **H** **L** **LH** **L** **H**
gut **chib** **mzin** or **gut** **mzin** **chib**
P.kill goat mouse *P.kill mouse goat*
goat kills mouse *mouse kills goat*

The change to **L** tone on the noun being possessed appears to be a grammatical tone change which serves to distinguish the possessive construction from the subject object construction.

4.3 Verb Aspects

AZ has at least seven aspects: Potential, Habitual, Progressive, Future, Unreal, Completive, and Imperative.

Table (23) shows the general tone distribution on verbs with their different aspects in a frame with the second person singular **lu** (**HL**) as subject and the clitic **ya it** (**H**) as object where necessary with transitive verbs. I observed no tone distinction between transitive and intransitive verbs. Neither the subject nor the object appears to cause tone perturbation in this case.

The tones listed in the far left column in the following two tables (23) and (24) are those pronounced on the verb in isolation. It has not yet been determined whether or not they indicate an underlying tone, nor what pronoun, if any, might have been in the speaker's mind when the word was recorded. The tone noted in each column indicates the tone of the verb in that aspect.

(23) Tone on Verb Aspects Example 1

	verb	subj	<i>P</i>	<i>H</i> n-	<i>PROG</i> ka-	<i>FUT</i> z-	<i>U</i> ng-	<i>C</i> m-	<i>IMP</i> b-
HL	xizh <i>laugh</i>	lu	H	HL	HL	HL	HL	HL	HL
HL	kwe <i>pull</i>	lu	H	HL	HL	HL	HL	HL	HL
LH	ded <i>pass</i>	lu	LH	HL	HL	HL	HL	L	L
L	lach <i>look at</i>	lu	L	L	HL	L	L	L	L

Table (24) shows a sampling of verbs in the same frames as the ones above only varying the subject. Even though other words representing all the tones were used in the subject slot, the verb behaved the same as with the second person singular **lu** (**HL**).

(24) Tone on Verb Aspects Example 2

	verb	subj	<i>P</i>	<i>H</i>	<i>PROG</i>	<i>FUT</i>	<i>U</i>	<i>C</i>	<i>IMP</i>
HL	le <i>do</i>	lu	HL	HL	HL	HL	HL	HL	H
		na	LH	HL	HL	HL	LH	LH	
L	lach <i>look at</i>	lu	L	L	HL	L	L	L	L
		na	H	LH	HL	L	LH	LH	
LH	lab <i>count</i>	lu	LH	LH	HL	LH	LH	LH	LH
		na	LH	LH	LH	LH	LH	LH	
LH	gaw <i>eat</i>	lu	LH	HL	HL	HL	HL	HL	HL
		na	LH	LH	LH	LH	LH	LH	
HL	kwe <i>pull</i>	lu	HL	HL	HL	HL	HL	HL	HL
		<i>Hna</i>	H	H	H	H	H	H	H

I have no analysis of the verb situation as yet since I do not know where to find the underlying tone on the verb. However, I do suspect that since the progressive aspect prefix **ka-** is high that it is somehow causing the verb to become falling since most verbs with the progressive aspect are falling. I also consider it significant that **lach look at**, which in isolation is level, remains level in all aspects except the progressive when followed by **lu 2SG**. And it becomes rising in habitual, unreal, and completive, as do level root nouns followed by **na**. The verb which is falling in isolation patterns after the nouns with falling roots type 1 when followed by **na** in the potential in that it becomes rising.

5 Conclusion

The data is conclusive that first singular **na** is unique in that it causes tone sandhi to occur on the previous word (to the left) when it functions as a possessor, while all other pronouns maintain their underlying tone contours. Similar uniqueness in the behaviour of first singular has been

documented in other Zapotecan languages (Marks 1976, Bickmore and Broadwell 1998, for Sierra Juarez Zapotec; and many others by personal communication). While some pronouns have shown variations from time to time, they are not considered to be emic. **Na** does not cause tone sandhi to the right when it is fronted.

There is some indication that **na** also causes perturbation on verbs, especially in the potential aspect. That will have to be studied further.

AZ tone appears to be constant on most words unless an overriding grammatical rule causes change, such as occurs with a noun and its possessor or with verbs in their different aspects.

The following need to be investigated further:

- Nouns with adjectives.
- The effect of laryngealization on tone.
- The effect of negative and adverbial affixes on tone.
- The effect of historically syllabic consonants on tone. For example: **msi**.
- Verbs in different positions in a frame.
- Exceptional words.

Abbreviations

The following table gives the abbreviations used in this paper.

1PLEX	=	first person plural exclusive
1SG	=	first person singular
2PL	=	second person plural
2SG	=	second person singular
3	=	third person
3CH	=	third person child
3F	=	third person feminine
3IN	=	third person inanimate
AZ	=	Amatlán Zapotec
C	=	completive
FOC	=	focus
FUT	=	future
H	=	habitual aspect on verbs
H	=	high tone
HL	=	falling tone
IMP	=	imperative
L	=	low tone
LH	=	rising tone
P	=	potential
PROG	=	progressive

Q = question particle/marker
U = unreal

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