

# **Tone in *tchourama* (Turka)**

## **A Descriptive Summary**

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# 1 Introduction

## Purpose and Scope of this Paper

The main purpose of this paper is to present a descriptive summary of tone phenomena in Turka language, along with a proposal of the underlying forms and a statement of tone spreading rules. This paper is written also in fulfillment of the TSD requirements on SIL language teams working in Burkina Faso.

This paper does not purport to provide a rigorous theoretical explanation of the data. In particular, the sorting out of rule ordering and the distinction of what is lexical and what is post-lexical are beyond my interests as a field linguist. I will therefore leave these details to the experts who are more acquainted with the current theories.

## Acknowledgements

I am indebted to Keith Snider (SIL, Cameroon) and Phil Davison (SIL, Mali) who helped me a great deal in understanding tone in Turka during a 4-week workshop help in Ouagadougou in 1997. I also thank my language assistant, Mamadou SOURABIE, who patiently endured countless repetitions of tone frames. Finally, I give thanks to God — the master engineer who designed it all — for the grace he gave me to hear and comprehend what had previously been a complete and total mystery.

## Theoretical Framework and Model

This paper uses the theoretical framework and model called “Register Tier Theory” as developed by Keith Snider (1997). This theory is an extension of autosegmental phonology. Among other things, this theory assumes that tone phenomena can best be explained as the operating of two independent tiers: a tonal tier and a register tier. This model is particularly helpful in describing downstep, either automatic or non-automatic. Furthermore, Snider finds it helpful to place an emphasis on tone *melodies* as being the real underlying realities in (African?) tone systems, thus introducing the concept of a “*melodem*” as opposed to viewing individual tones as being the fundamental realities of tone systems. In this approach, the key to understanding a tone system is to identify the underlying melodies of words within a particular syntactic category (e.g. nouns and verbs) and to see how these melodies distribute over a variety of syllable patterns. The classic example illustrating the merits of this approach is Mende (example taken from Snider (1997), data from Leben 1978):

	One-Syllable		Two-Syllable		Three-Syllable	
Hi	kó	'war'	pélé	'house'	háwámá	'waistline'
Lo	kpà	'debt'	bèlè	'trousers'	kpàkàlì	'tripod chair'
Hi Lo	mbû	'owl'	ngílà	'dog'	félàmà	'junction'
Low Hi	mbǎ	'rice'	fândé	'cotton'	ndàvúlá	'sling'
Lo Hi Lo	mbã	'companion'	nyàhâ	'woman'	nìkìlì	'groundnut'

A classical phonemic analysis would yield five *tonemes* with the prediction is each individual *toneme* can operate as a unit, but clearly this is not the case. The above chart shows that “high-low-high” is in fact a noun *melody* which is distributed according to the number of syllables in the noun root. (For full details, see Snider (1997).

## 2 Overview of Tone Melodies

In the case of *Turka*, this approach has proved to be very fruitful. There are nine underlying melodies in *Turka* (see Table 1) and these melodies work like clockwork — once the underlying melody of a word is correctly identified, it is predictable what the tonal outcome will be in a given frame.

Of the nine melodies, seven are exploited by nouns whereas verbs only use four melodies. In addition to these, a simple melody of “High” exists for some verb particles and pronouns. Suprasegmental grammatical tone also exists; this will be presented in a later section. There are also obligatory register shifts (I assume to be caused by low boundary tones) between certain constituents of the grammatical phrase (see section of verb particles). Melody #9 could be a variant of melody #4 but it is impossible to tell since 1) low-tone subject pronouns cannot be placed in frame before a low tone verb — verbs do not take this melody and 2) the weak-high of melody #4 only appears if there is a right-edge low tone. Table 1 lists the underlying melodies and where they occur:

**Table 1: List Tone Melodies**

	Melody	Nouns	Verbs	Particles	Pronouns	Grammatical
1.	(H) floating/weak high	yes	yes	yes	yes	no
2.	H!H high downstepped-high	yes	yes	yes	no	no
3.	HL(H) high low weak-high	yes	yes	yes	no	no
4.	L(H) low weak-high	yes	marginal	no	no	no
5.	LH low high	yes	no	no	no	no
6.	LH!H low high ! high	yes	no	no	no	no
7.	HLH high low high	yes	no	no	no	no
8.	H high	no	no	yes	yes	yes
9.	L low	no	no	no	yes	yes

Detailed phonetic traces showing the outworking of how the first five melodies interact with one another in various tone frames are presented in Appendix 1. With one exception — that of low tone neutralizing of H!H — the noun tone frames are explained completely in one single rule which is presented later in this overview. A structural derivation of this case and others are presented in the following chapters.

This paper does not deal with minor variants of a melody — variants caused by different syllable structures — since these are predictable and are accounted for in the constraint rules given below.

### A Two Tone System

According to this present analysis, all tone phenomena in *Turka* can be explained as sequences of two level tones — high and low — along with register shifts, i.e. automatic and non-automatic downstep phenomena. Phonetic mid-tones are explained as underlyingly downstepped high-tones since they never exist alone (i.e. there is no melody “mid”); rather, mid-tones exist only in complex melody #2 (High, downstepped-high.) and complex melody #6. The structural presentation of phonetic mid-tones is presented in the next chapter.

### First Analysis

As I see it, there are two possible analyses which adequately explain the data. Version one treats the nine melodies as being lexically assigned. In this view, it is important to make a distinction between lexically *weak* high tones and lexically *strong* high tones. Lexically weak high tones are always displaced by low tones; lexically strong high tones, however, are never displaced. Moreover, there appears to be only *one*

tone spreading rule operating in Turka: **Low tone spreads to lexically weak high tones.** A second analysis, which will be presented later, treats the so-called *weak* high tones as a default tone assigned to toneless TBU's according to certain rules.

Here is a fuller explanation of the low tone and tow register spreading rule:

- Low register (l) spreads rightward iteratively, domain *nonrestricted* producing terracing downstep. In other words, high register is always delinked by a preceding low register and causes downstep.
- Low tone (L), on the other hand, spreads rightwards iteratively, domain *restricted* within words and across word boundaries onto Weak-High tones.

Concerning tone assignment to TBUs, the following constraints apply:

- Vowels, nasals, semi-vowels and /l/ can bear tone.
- Two tones cannot occupy a short vowel, nasal or semi-vowel.
- Two tones can occupy long vowels, diphthongs, or V+N or N+V sequences.
- Three tones can never occupy a single syllable.

Understanding the practical application of the above will become clear with the following examples:

**Table 2: Low Tone Displacement of Weak-High Tones across word boundaries**

	Column 1	Column 2	Column 3
<b>(H)</b>			
1sy	káa+gù daba	mè kaa' my daba	mè kaa+gù my daba
2sy	párcaa+gù lake	mè parcaa' my lake	mè parcaa+gù my lake

Column 1 shows two nouns in isolation with their low tone noun class suffix *-gu*. (Morpheme boundaries are indicated by the '+' sign.) Both of these nouns have underlyingly the Weak-High tone melody (melody #1). Column 2 and Column 3 shows the effect that a preceding low tone has on a Weak-High tone. In Column 2, the low-tone in the pronoun «mè» spreads rightward iteratively and completely displaces the Weak-High tone of the two nouns such that the Weak-High tone is now floating. (Note, in this case, the noun class suffix, which is not obligatory, has been dropped.) In Column 3, with a "right-edge" low tone in place, (namely the low tone on the suffix *-gu*.) we see that the low tone on the pronoun cannot completely displace the Weak-High tone of the noun root (domain restricted), but the Weak-High tone is pushed as far as possible, i.e. up to the right-edge low tone on the noun class suffix. Note also how the low tone spreads half-way onto the long vowel of *parcaa-*.

Low tone spreading operates across word boundaries (as above), but also within word boundaries as shown below:

**Table 3: Low Tone Displacement of Floating High within words**

	Column 1	Column 2
<b>L(H)</b>		
1sy	sùó+gù place	sùó' place
2sy	nùgó+gù basket	nùgó' basket

The words in Table 2 are underlying Low Weak-High, (melody #4). Again, column one shows the words with a right-edge low tone (the noun class suffix *-gu*), and column two shows the words without the suffix. Without a right edge low tone, low tone completely displaces the Weak-High tone and it is sent floating.

As mentioned previously, **strong** high tones are *not* displaced by low tones. This is illustrated in the following table which compares melody #4, L(H), with melody #5, LH:

**Table 4: Floating High Compared with Lexically Assigned High**

	Column 1	Column 2
<b>L(H)</b>		
<i>1sy</i>	sùó+gù place	sùó+daá+gù place the-other
<i>2sy</i>	nùgó+gù basket	nùgó+daá+gù basket the-other
<b>LH</b>		
<i>1sy</i>	plòó+gù rônier branch	plòó+daá+gù rônier branch the-other
<i>2sy</i>	tìntîé+gù peanut	tìntîé+daa+gù peanut the-other
<b>HL(H)</b>		
<i>1sy</i>	lwáa+gù river	lwáa+daá+gù river the-other
<i>2sy</i>	húcùú+gù hat	húcùú+daá+gù hat the-other

Column 1 shows three sets of two words each from three melody groups: first L(H), second LH and third HL(H). Note how words in group L(H) and group LH are phonetically identical when elicited in isolation (Column 1). However, Column 2 shows that there is in fact a distinction between the two groups of words and that this can be accounted for by positing a distinction between **Strong-High** tones and **Weak-High** tones. I assume that the infix *daa* 'the other' underlying belongs to melody #1 (Weak-High.) The Weak-High of this infix and that of the L(H) merge and then, according to our low-tone spreading rules, the Weak-High is displaced rightwards until it encounters a low-tone right boundary, namely, the *-gu* noun class suffix. This phenomena is further exemplified in the words 'river' and 'hat' of melody group HL(H). However, the Hs of the LH words 'rônier branch' and 'peanut' are *not* displaced even when the low-tone right boundary is extended by the insertion of the infix *daa*.

I am assuming that mono-syllabic roots like *lwaa* 'river' belong to the three-toned melody #3, HL(H) even though the Weak-High is never realized phonetically. One could say that this was a new melody, High-Low. This would be a reasonable hypothesis if it were not for the fact that the melody High-Low does not exist elsewhere in two or three syllable noun roots or verbs.

### Alternative Analysis

A second analysis treats Weak-High tones as a *default tone* which gets assigned to *toneless* TBU's or when a TBU is bounded on the left and right by low tones (as described above). Since the low-tone spread and Weak-High displacement occurs both within words and across word boundaries, I'm not sure

if this process is lexical or post-lexical or both. I leave these finer theoretical details to the experts. If the weak-high is viewed in this way, it will simplify melodies #1, #3 and #4 as follows:

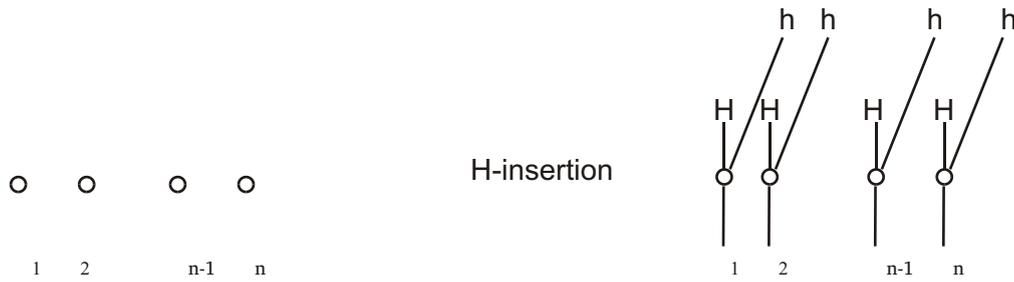
**Table 1: New Proposal of Tone Melodies**

	<b>Old System</b>	<b>New System</b>
1.	(H) floating/weak high	toneless
3.	HL(H) high low weak-high	HL high low
4/9.	L(H) low weak-high	L low

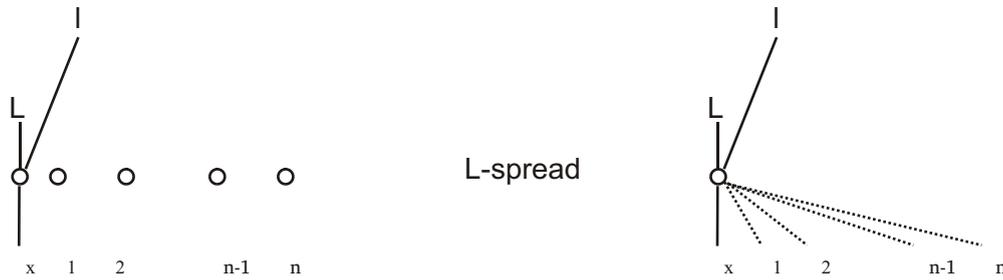
I feel that this alternative analysis has merit and I will adopt this viewpoint for the remainder of this paper. Note that with this analysis, melody #9 and melody #4 collapse into one. The new description of our tone spreading rules are presented on the next page.

## Alternative Statement of Tone Rules

**Case 1: a series of  $n$  toneless units, no left edge low tone. Result: H-insertion onto toneless TBUs.**



**Case 2: left edge low tone followed by a series of  $n$  toneless TBUs followed by end of phrase. Result: low tone spreads completely to all toneless TBUs, no H insertion.**



**Case 3: left edge low tone followed by  $n$  toneless TBUs followed by a low tone. Result: L spreads rightwards up to  $TBU_{n-1}$  and H is inserted onto  $TBU_n$ .**



In addition to the operation of L-spread and H-insertion, we retain the rule of low register spread, iteratively, domain unrestricted thus causing terracing downstep be it automatic or non-automatic.



### 3 Noun Tone Melodies

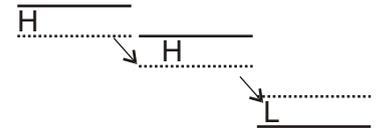
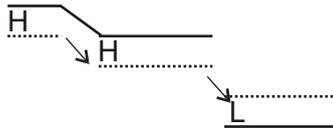
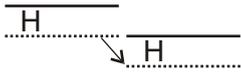
There are seven underlying noun tone melodies in Turka. Melodies #6 and #7 are very rare and therefore marginal and will not be discussed. Since melody #1 is toneless, it will not be presented either. Below are the underlying forms of the melodies #2, #3, #4 and #5. Two examples are given, the first with a one syllable noun root and the second with a two syllable root. All nouns are taken from noun class number #3 which has a low tone suffix '-gu'.

#### 2) High ! High

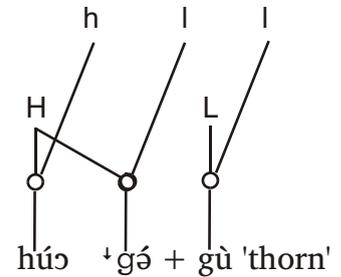
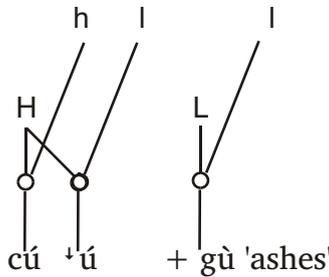
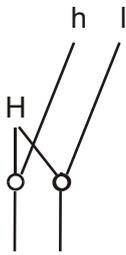
Ex. 1 = 'ashes'

Ex. 2 = 'thorn'

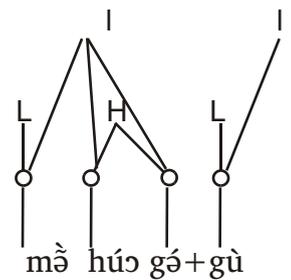
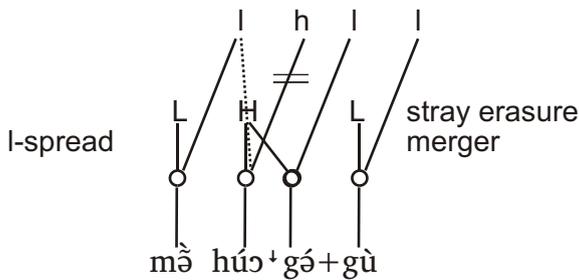
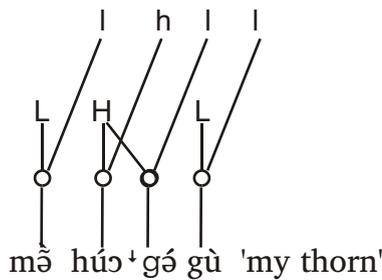
#### Phonetic representation



#### Structural representation



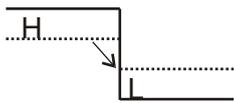
#### Explanatory derivation of low tone spread neutralization of H!H



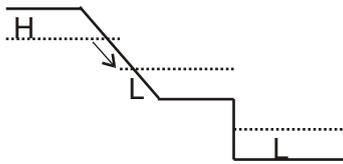
The above derivation will not withstand the rigors of Snider's theory, however. In particular, according to the model, the delinked *h* should still block merger and so there must be some other mechanism at work which is more complex than is presented here. As mentioned previously, I leave these finer details to the experts.

### 3) High Low

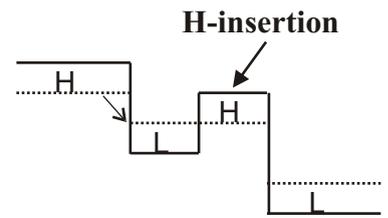
#### Phonetic representation



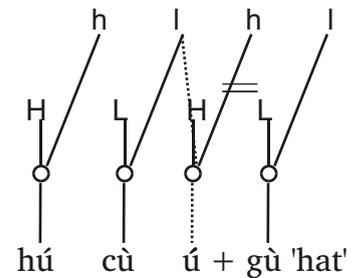
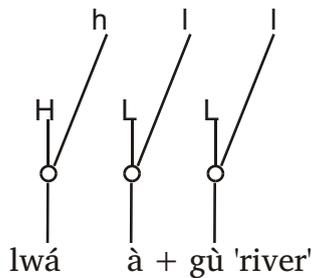
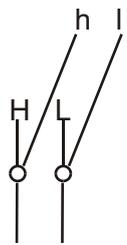
#### Ex. 1 = 'river'



#### Ex. 2 = 'hat'



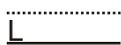
#### Structural representation



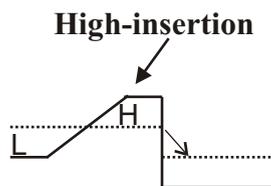
H-insertion does not occur in the one syllable example because of the constraint of a maximum of two tones per syllable.

### 4) Low

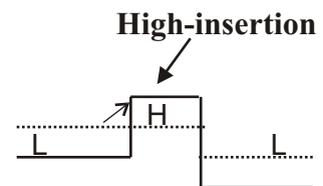
#### Phonetic representation



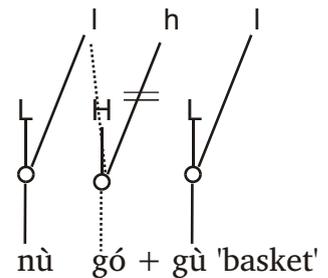
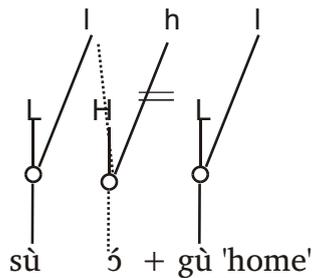
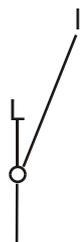
#### Ex. 1 = 'home'



#### Ex. 2 'basket'



#### Structural representation

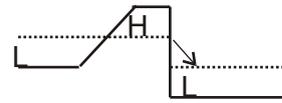
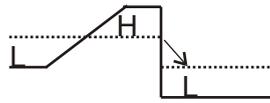
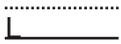


5) Low-High

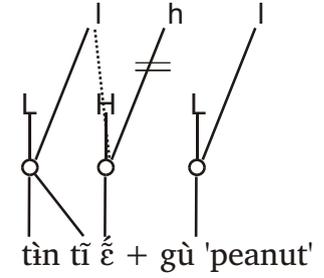
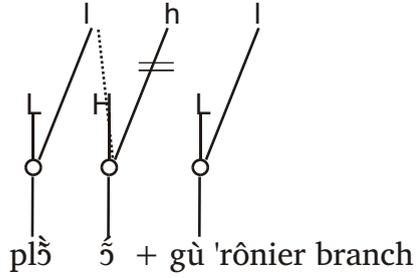
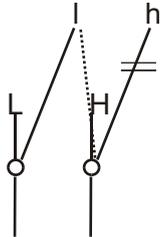
Ex. 1 = 'rônier branch'

Ex. 2 'peanut'

Phonetic representation



Structural representation



## 4 Verb Melodies

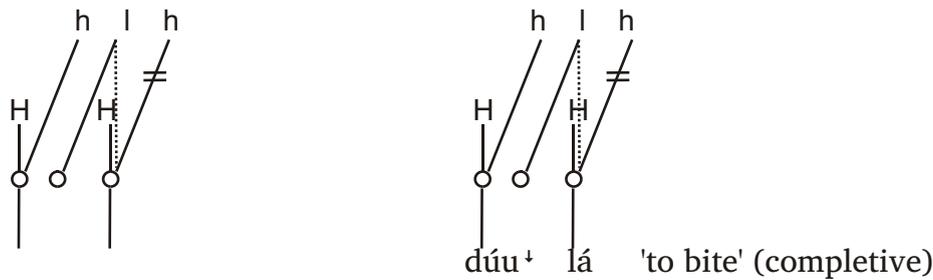
*Turka* verbs have three forms, an unmarked form, and form #2 and form #3. (The details of the semantic and syntactic properties of these forms are discussed in the document on morphosyntax.) The unmarked form can co-occur with any verb particle and over 80% of the unmarked verb forms are toneless; the rest are either melody #3 or melody #4. Melody #4 is very rare and is used only for a couple of stative verbs. All form #2 verbs have melody #2, H!H and form #3 is always melody #3. I have encountered two slightly different (dialect) variants for the melody #2 verb form. The first variant follows the same processes as do melody #2 nouns, and in particular, there is a neutralization of the downstep following a low tone. In the second variant, a preceding low tone does not neutralize the downstep. I will present the second variant here.

**Table 6: Verb Melodies**

	<u>pn</u> +Vb	<u>pn</u> L + Vb	H insertion	D.O. Boundry tone	Neutralized BT
<i>1sy</i>	yí dúu we bite	mè dùu I bite	mè dùú tìntíé+gù I bite peanut	yí dúu+káa+gù we bite daba	mè dùu káa+gù I bite daba
<i>2sy</i>	yí páaráa we play	mè pàaràa I play	mè pàaràá tìntíé+gù I play peanut	yí páaráa+káa+gù we play daba	mè pàaràa káa+gù I play daba
<b>HL</b>					
<i>1sy</i>	yí túù we carry	mè túù I carry	mè túù tìntíé+gù I carry peanut	yí túù káa+gù We play daba	mè túù káa+gù I carry daba
<i>2sy</i>	yí mégàa we repair	mè mégàa I repair	mè mégàá tìntíé+gù I repair peanut	yí mégàa kaa+gù We repair daba	mè mégàa káa+gù I repair daba
<b>H!H</b>					
<i>2sy</i>	yí dúu+lá We bite-PST	mè dúu+lá I bite-PST	mè dúu+lá tìntíé+gù I bite-PST peanut	yí dúu+lá+káa+gù We bite-PST daba	mè dúu+lá+káa+gù I bite-PST daba

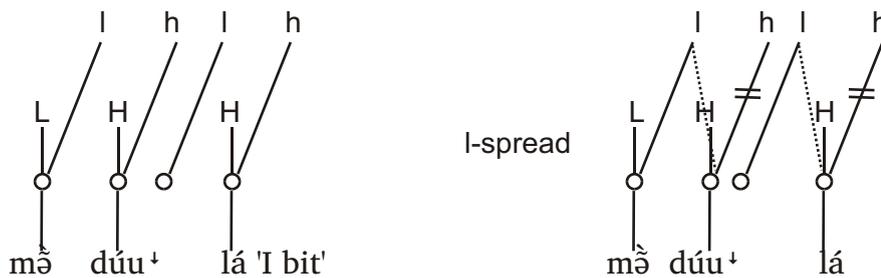
Column one shows the three verb melodies with the toneless pronoun, «yi» = ‘we’. The toneless pronoun receives a high tone by default as do the toneless verbs. Column two shows the effect a low tone pronoun has on the various verb melodies, in particular, (as we observed in the nouns,) toneless verbs become low following a low tone. Column three is similar to column two but adds a low tone direct object after the verb. This creates an environment favourable to allow a High tone insertion (i.e. “case 2” of the High tone insertion rule, namely, a toneless TBU bounded on the left and right by a low tone .) Thus, we observe that two toneless verbs 'bite' and 'play' rise on the last TBU as does the two-syllable HL verb 'repair'. The one-syllable HL verb, however, does not receive a final High tone since the all TBU's are already occupied (see TBU constraint rules, chapter 2.) Note also how the (2nd dialectic variant of) verbal melody H!H is somewhat different from that of nouns in that downstep is not neutralized after a low tone pronoun. The structural explanation of this would be to posit the following underlying form for H!H verbs:

### Structural representation



The intervening floating low register blocks merger when a low tone pronoun is placed before it:

### Structural representation



### Direct Object Pronoun Clitics

Direct object pronouns are toneless and phonologically clitics in *Turka*. I deduce this conclusion from the following tone frames which show that 1) the syntactic boundary tone between verb phrase and direct object shown in Table 6, column 4, does not intervene between verb phrase and direct object pronouns, and 2) direct object pronouns assume the same tone as the verb. Column 1 of Table 7 shows the simple phrases involving DO pronoun clitics with a toneless subject pronoun. In this case, the entire phrase receives the default high tone. Column 2 shows the exact same phrase examples only with a tone subject pronoun. In this case the entire phrase receives a low tone because the low tone from the subject spreads across to the verb and continues to the DO pronoun clitic.

**Table 7: Direct Object Pronoun Clitics**

Subject +Vb + DO	pn L + Vb	D.O. Boundry tone	Neutralized BT
yí dúu n̄ we bite you	mè dùu n̄ I bite you	yí dúu+káa+gù we bite daba	mè dùu káa+gù I bite daba
yí páaraa we play	mè pàaraa I play	yí páaraa+káa+gù we play daba	mè pàaraa káa+gù I play daba
yí túù we carry	mè túù I carry	yí túù káa+gù We play daba	mè túù káa+gù I carry daba
yí mēgàa we repair	mè mēgàa I repair	yí mēgàa kaa+gù We repair daba	mè mēgàa káa+gù I repair daba

## 5 Verb Particles

The order of constituents in a Turka (simple) phrase is as follows:

**Subject[NP] (Aspect/Tense[Aux] *l*) MainVerb (*l* Direct-Object[NP])**

Verb particles (auxiliaries) carry aspect and tense information. The auxiliary constituent contains two elements: 1) the verb particle and 2) a floating low register *l*. This low register causes a downstep provided merger has not occurred. Similarly, the direct object constituent contains two elements: 1) a floating low register *l* and 2) a direct object noun phrase. The low register causes a downstep before any direct object.

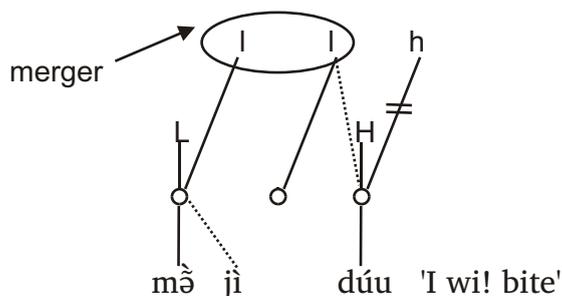
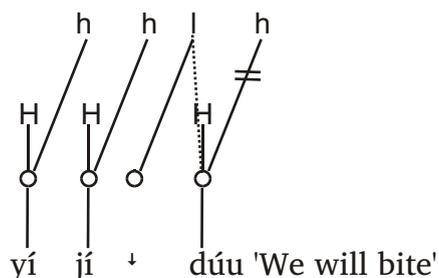
### Toneless Verb Particles

There are two toneless verb particles, 'ji' = simple future marker, and 'ga' = future action involving movement away from current point of reference. In the example below, column 1 shows the particle 'ji'

<u>Pn</u>	<u>+Vb</u>	<u>pn L + Vb</u>
yí	jí + dúu	mě jì dúu
we	will bite	I will bite

preceded by the toneless pronoun 'yi' = *we*. Both the pronoun and the particle receive the default high tone. Immediately following the verb particle is a floating low register which causes the verb to be downstepped. In column 2, a low tone pronoun spreads its tone onto the particle. I assume that the low register from the pronoun merges with the floating low register of the auxiliary constituent. Moreover, it appears that the low tone cannot spread beyond one word and so doesn't affect the verb. Elsewhere (see particles with HL melody) we do see tone from a particle spread onto the verb.)

### Structural representation



## High Tone verb particles

These include: 'saa' negation, completive aspect; 'baa' negation, imperative mood.

<b>Pn</b> + <b>Vb</b>	<b>pn L + Vb</b>	<b>pn L + Vb</b>
yí sáa <sup>ˈ</sup> dúu we didn't bite	mè sáa <sup>ˈ</sup> dúu I didn't bite	báa <sup>ˈ</sup> dúu Don't bite!

## High ! High Verb Particles

There is one particle with this melody, 'sii' = non-completive (future) negation.

<b>Pn</b> + <b>Vb</b>	<b>pn L + Vb</b>
yí sí <sup>ˈ</sup> i <sup>ˈ</sup> dúu we won't bite	mè sí <sup>ˈ</sup> i <sup>ˈ</sup> dúu I won't bite

## High-Low Verb Particles

There are two particles, 'sîn' = habitual negation (present), and 'sâa' = habitual negation (past).

<b>Pn</b> + <b>Vb</b>	<b>pn L + Vb</b>	<b>Pn</b> + <b>Vb</b>	<b>pn L + Vb</b>
yí sîn dùu we never bite	mè sîn dùu I never bite	yí sâa dùu we weren't biting	mè sâa dùu I wasn't biting

## 6 Grammatical Tone

### Subjunctive Mood

The subjunctive mood is realised by placing a high tone on the head of the subject noun phrase. This is either a pronoun or a noun suffix (unless, of course, the subject is a proper name). This high tone is followed by a register shift. Below are several examples. To facilitate comprehension, underlying lexical tone forms are provided below the surface tone marking:

	Indicative Mood	Subjunctive Mood
	_____	_____
Surface	wù kù	wú <sup>+</sup> kú
UF	wù ku	
Trans.	He dies.	May he die!
	_____	_____
	wù kúugù cà	wù kúugú <sup>+</sup> cá
	wù kú <sup>+</sup> úgù ca	
	His death is-difficult.	May his death be difficult!

### ‘Narrative Past’

When telling a story that has happened in the past, as soon as the setting of ‘past tense’ has been established, the story teller will employ the “narrative past” aspect. In this mode, the teller uses the ‘non-completive’ verb form (which normally would indicate the present tense) in order to make the story more interesting and lively. The past-tense information is still retained, however, by placing a high tone on the subject followed by a register shift. A fully parsed text example is provided in appendix 3.

## 7 Pronouns and Miscellaneous Topics

Previously, I proposed that there is a boundry tone

**Table :**

	Column 1	Column 2	Column 3
(H) 1 <sub>sy</sub>	káa+gù daba	mè kaa' my daba	mè kaá+gù my daba
2 <sub>sy</sub>	párcaa+gù lake	mè parcaa' my lake	mè parcaá+gù my lake

**Table 2.**

Person/ Number	Subject	Possessor	Direct Object	Demonstrative ( Subject)	Emphatic Subject / Emphatic Possessor
1s		mè	m	máã	máã
2s		n	n	yí	yí
1p	yí	yì	yə	hámĩ	hámĩ
2p	ɲá	ɲà	ɲã	ɲámáã	ɲámáã

## 8 Tone Erasure Phenomena

Several grammatical constructions seem to cause tone erasure on pronouns which would otherwise have a low tone. I analyze these phenomena as tone erasure since the resulting pattern for the pronoun and verb is the same as other toneless pronouns (see table 7, plural pronoun *yi* ‘we’). More specifically, the subject pronoun carries a default high tone and toneless verbs carry the same tone level.

### Reported / Indirect Speech

Indirect speech causes tone perturbations. The reported speech is introduced by the particle ‘wa’ (low tone) followed by the reported speech. Tone on the subject pronoun seems to be neutralized, that is, the pronouns and verb sequence follows the pattern of toneless pronouns. This means that the subject pronoun carries a high tone and the , there is no downstep following this pronoun except when the reported speech is in the subjunctive or imperative mood. The following chart shows some examples:

	Direct Speech	Reported Speech
1.	wù dùu ‘he bites’	wù wà nǐ yì wà wú dúu. ‘he says that he bites’ he says to him QM he bites
2.	dúu ‘bite!’	wù wà nǐ yə wà wú † dúu ‘he tells him to bite!’
3.	báa † dúu ‘don’t bite!’	wù wà nǐ yə wú báa † dúu ‘he tells him to not bite!’

## 7 Statistics

### Melody Distribution

Out on an inventory of 507 non-compound nouns (singular form) and 336 verbs (unmarked form) the following statistics arise:

**Table 3: Melody Distribution Statistics**

	Melody	Nouns							Verbs					
		Total Words	% of Total	1 syl	2 syl	3 syl	4 syl	Total Syllables	Total Words	% of Total	1 syl	2 syl	3 syl	Total Syllables
1.		172	33.9	81	75	16	0	279	281	83.6	210	61	10	362
2.	H!H	78	15.4	33	39	6	0	129	0	0.0	0	0	0	0
3.	HL	67	13.2	20	40	7	0	121	53	15.8	22	29	2	86
4.	L	83	16.4	32	47	4	0	138	2	0.6	2	0	0	2
5.	LH	82	16.2	17	46	16	3	169	0	0.0	0	0	0	0
6/7		25	4.9	0	18	7	0	56	0	0.0	0	0	0	0
	Sum	507	100.0	183	265	56	3	892	336	100.0	234	90	12	450
	%age	100		36.1	52.3	11.0	0.6				69.6	26.8	3.6	

What is the potential ambiguity load for an unmarked orthography in Turka? From our word list, the following potential ambiguities exist in nouns. (Note that even though there are verb-noun minimal pairs, syntax will always resolve these ambiguities, and therefore, this is not taken into consideration.) Among nouns, no ambiguities exist in roots with more than two syllables. The table shows that there are surprisingly very few ambiguities in Turka. Also, if semantics and context were taken into consideration, many of these ambiguities would be removed.

**Table 4: Ambiguity Load on nouns for an unmarked orthography.**

	1	2	3	4	5/6/7		1	2	3	4	5/6/7
bie	x	x				myāl			x		x
blaa		x		x	x	naruu	x		x		
bli	x			x		paar	x			x	
būō	xx					surūō	x				x
curō	x				x	suō		x		x	
cuu	x	x		x		tarbloor			x		x
dugo	x				x	tāō		x			x
dwar	x				x	tīē		x		x	
furūū	x				x	tuu		x		x	
guu	x				x	tuur		x			
huō	x			x		yisi	x		x		
huōgə	x	x				yuu	x		x		
hyaar	x	x				kuu	x	x			
kaar			xx		x	kwal	x				x
kuōl	x	x				kwasə	x				x
kuruu				x	x	lwaa	x		x		
kuu	x	x									

## 8 Orthography Proposal

Given that:

- 1. Most reading theories suggest the importance of maintaining a fixed word image.
- 2 Writing the Weak/floating/default high tone (depending on your analysis) would erase any hope of retaining a fixed word image.
- 3. Surface tone marking has proven to be a very poor method of marking tone both in terms of ease of reading and ease of writing (Bird 1997).
- 4. Tone melodies in *Turka* are well structured and predictable,

It stands to reason that *melodies*, and *not tones* per se should be written. This can easily be achieved by marking the very first vowel of a root with a unique symbol which would indicate the tone “class” or melody. (This method has been followed with some success in Côte d'Ivoire.) No further marking would be necessary on the root. In other words, regardless of the number of syllables a word has, only one symbol would be marked to represent the entire tone melody. The big advantage of this system is that it retains a constant word image. Words will always be written in the same way in all contexts. This method assumes that the tone melodies are phonological realities for most speakers and therefore this system can be taught. Moreover, for speakers /writers who are less adept at tone than others (my second language helper being a case in point,) they can always resort to memorizing word images or looking up in a lexicon, or, in the case of reading, simply deducing from context the correct tone.

Secondly, given the high frequency of melody #1, it seems reasonable that this melody should be marked by the *absence* of any symbol, i.e. it will left ‘unmarked’. Furthermore, given the rarity of melodies #6 and #7, these will not be marked.

**Table 1: Proposed Orthography**

	Melody	Marking	Monosyllabic Examples		Disyllabic Examples	
1.		not marked	kaagù	'daba'	parcaagù	'lake'
2.	H!H	mid tone symbol	kwāagù	'pond'	hūṵgəgù	'thorn'
3.	HL	high-low tone symbol	lwāagù	'river'	hūcuugù	'hat'
4.	L	low tone symbol	sùṵgù	'place'	nùgogù	'basket'
5.	LH	low-high tone symbol	plǔṵgù	'rônier branch	tǎntĩṵgù	'peanut'
6.	LH!H	not marked				
7.	HLH	not marked				
8.	H	high tone symbol	sáa	Negation	n/a	

### Other Rules

- Grammatical tone on enclitics [-í] (yes/no question marker) and [-ì] (definite article) (not discussed in this paper) will be indicated by the use of punctuation rather than tone marks, namely, a question mark at the end of the phrase for interrogative mood and a period for the indicative mood.
- The subjunctive mood which is in a very real sense a third or first person imperative will be indicated with an exclamation point rather than marking high tone on the subject.
- Pronouns will not be marked for tone.
- The historic past aspect which is indicated by a high tone on the subject will not be marked since this literary feature is automatic in story telling (this has been proven in a reading experiment) and is evident once the context of a story has been established (using verb auxiliaries).

- All verbs will be marked for tone. (Recall however, that over 80% of verbs are melody #1 which is not marked.)
- All verb particles will be marked for tone.
- Only one and two syllable noun roots will be marked for tone. Rationnale: 1) No ambiguities exist beyond two syllable roots; 2) I assume that it is possible to teach the notion of a 'syllable' and that this principle will be easier to teach and apply than (say) the 'mark-only-mininal-pairs' rule which experience has shown to be difficult to apply and teach.
- Noun suffixes will not be marked for tone since this is redundant information (they are all low tone.)

I feel that the above system provides a reasonable compromise between meeting the needs of readers and writers alike. In the sample text given in Appendix 3, I calculate 286 syllables (excluding proper nouns) and 40 tone diacritics giving a density tone diacritics to syllables of 14%. I feel this is not too high of a burden to place on readers or writers and furthermore it will suffice in terms of removing any protential ambiguities in the text.

N.B. Addendum July 2005

The above orthography proposal was the first of many trail orthographies which we have evaluated. For a more recent version of how tone is written in Turka, see “Guide d’orthographe tchourama.”

## Appendix 1: Phonetic Traces of Noun Tone Frames

The following chart show the outworkings of melodies #1 to #5 in various tone frames. Chart #1 shows in general the five melodies and the effect of placing a low tone before the melody has on the pitch trace. Chart #2 shows a 5x5 matrix displaying all possible melodies combinations. This effect was easily achieved using the associative / genitive construction in Turka of the form:

Noun Root	+ Associative Marker	+Noun Root	+Noun Suffix
[Owner]	'n'	[thing owned]	(of thing owned)

Example:

vaa + n + yuu + gu  
dog 's head  
'the dog's head'

The associative marker, a syllabic nasal, is toneless and does not affect the phonetic pitch traces.

## Tone Frame – Chart # 1 – Low Tone Spreading & Weak-High Displacement

	Radical	Radical+NC	Radical+infix+NC	Radical #	Radical+NC # High	# Radical	L # Rad.+NC
<i>1sy</i>	káa daba	káagù daba	káadaagù daba the-other	káa pyer daba is-white	káagù pyér daba is-white	mè kaa' my daba	mè kaagù my daba
<i>2sy</i>	párcaa lake	párcaagù lake	párcaadaagù lake the-other	párcaa pyér lake is-white	párcaagu pyér lake is-white	mè parcaa' my lake	mè parcaagù my lake
<b>H!H</b>							
<i>1sy</i>	kwá'á river	kwá'ágù river	kwá'ádaagù river the-other	kwá'á pyer river is-white	kwá'ágù pyer river is-white	mè kwaa my river	mè kwá'ágù my river
<i>2sy</i>	húo'gé thorn	húo'gégù thorn	húo'gèdaagù thorn the-other	húo'gé pyér thorn is-white	húo'gégù pyér thorn is-white	mè húogè my thorn	mè húogègù my thorn
<b>HL</b>							
<i>1sy</i>	lwáa river	lwaagù river	lwaadaagù river the-other	lwáa pyér river is-white	lwaagù pyér river is-white	mè lwaa my river	mè lwaagù my river
<i>2sy</i>	húcùu hat	húcùugù hat	húcùudaagù hat the-other	húcùu pyér hat is-white	húcùugù pyér hat is-white	mè húcùu' my hat	mè húcùugù my hat
<b>L</b>							
<i>1sy</i>	sùo place	sùogù place	sùodaagù place the-other	sùo pyér place is-white	sùogù pyér place is-white	mè sùo' my place	mè sùogù my place
<i>2sy</i>	nùgo basket	nùgogù basket	nùgodaagù basket the-other	nùgo pyér basket is-white	nùgogù pyér basket is-white	mè nùgo' my basket	mè nùgogù my basket
<b>LH</b>							
<i>1sy</i>	plòó rônier branch	plòógù rônier branch	plòódaagù branch the-other	plòó pyér branch is-white	plòógù pyér branch is-white	mè plòógù my branch	mè plòógù my branch
<i>2sy</i>	tìntié peanut	tìntiégù peanut	tìntiédaagù peanut the-other	tìntié pyér peanut is-white	tìntiégù pyér peanut is-white	mè tìntié my peanut	mè tìntiégù my peanut

## Tone Frames - Chart # 2 – Associative Construction Melody Combinations

Melody	<i>mouth-of 1sy</i>	<i>skin-of 2sy</i>	<b>H!H</b> <i>house-of 1sy</i>	<b>H!H</b> <i>thorn-of 2sy</i>	<b>HL</b> <i>head-of 1sy</i>	<b>HL</b> <i>hat-of 2sy</i>	<b>L</b> <i>place-of 1sy</i>	<b>L</b> <i>basket-of 2sy</i>
<i>1sy</i>	káanōōgù daba's mouth	káacālūūgù daba's skin	káansú'ógù daba's house	káanhúo'gégù daba's thorn	káanyúūgù daba's head	káanhúcuūgù daba's hat	káansúógù daba's place-of	káannúógù daba's basket
<i>2sy</i>	párcanōōgù lake's mouth	párcancālūūgù lake's skin	párcansú'ógù lake's house	párcanhúo'gégù lake's thorn	párcanyúūgù lake's head	párcanhúcuūgù lake's hat	parcaansúógù lake's place-of	parcaannúógù lake's basket
<b>H!H</b>								
<i>1sy</i>	kwa'ánōōgù river's mouth	kwa'ancālūūgù river's skin	kwa'ánsú'ógù river's house	kwa'ánhúo'gégù river's thorn	kwa'ányúūgù river's head	kwa'ánhúcuūgù river's hat	kwa'ánsúógù river's place-of	kwa'ánnúógù river's basket
<i>2sy</i>	húo'génōōgù thorn's mouth	húo'gencālūūgù thorn's skin	húo'génsú'ógù thorn's house	húo'génhúo'gégù thorn's thorn	húo'géyúūgù thorn's head	húo'génhúcuūgù thorn's hat	húo'génsúógù thorn's place-of	húo'génnúógù thorn's basket
<b>HL</b>								
<i>1sy</i>	lwaànōōgù river's mouth	lwaàncālūūgù river's skin	lwaànsú'ógù river's house	lwaàn húogégù river's thorn	lwaànyúūgù river's head	lwaàn húcuūgù river's hat	lwaànsúógù river's place-of	lwaànnúógù river's basket
<i>2sy</i>	húcuunōōgù hat's mouth	húcuuncālūūgù hat's skin	húcuunsú'ógù hat's house	húcuunhúogégù hat's thorn	húcuunyúūgù hat's head	húcuunhúcuūgù hat's hat	húcuunsúógù hat's place-of	húcuunnúógù hat's basket
<b>L</b>								
<i>1sy</i>	sùonōōgù place's mouth	sùoncālūūgù place's skin	sùonsú'ógù place's house	sùonhúogégù place's thorn	sùonyúūgù place's head	sùonhúcuūgù place's hat	sùonsúógù place's place	sùonnúógù place's basket
<i>2sy</i>	nùgonōōgù basket's mouth	nùgoncālūūgù basket's skin	nùgonsú'ógù basket's house	nùgonhúogégù basket's thorn	nùgonyúūgù basket's head	nùgonhúcuūgù basket's hat	nùgonsúógù basket's place-of	nùgonnùógù basket's basket
<b>LH</b>								
<i>1sy</i>	plòónōōgù branch's mouth	plòòncālūūgù branch's skin	plòònsú'ógù branch's house	plòònhúo'gégù branch's thorn	plòònyúūgù branch's head	plòònhúcuūgù branch's hat	plòònsúógù branch's place-of	plòònnúógù branch's basket
<i>2sy</i>	tìntiēnōōgù peanut's mouth	tìntiēncālūūgù peanut's skin	tìntiēnsú'ógù peanut's house	tìntiēnhúo'gégù peanut's thorn	tìntiēnyúūgù peanut's head	tìntiēnhúcuūgù peanut's hat	tìntiēn peanut's	tìntiēnnúógù peanut's basket

**Tone Frames - Chart # 3 – Associative Construction Melody Combinations (con't)**

<b>Melody</b>	<b>LH</b> <i>branch-of 1sy</i>	<b>LH</b> <i>peanut-of 2sy</i>
<i>1sy</i>	káanplòóǵù daba's branch	káantìntíéǵù daba's peanut
<i>2sy</i>	parcaanplòóǵù lake's branch	parcaantìntíéǵù lake's peanut
<b>H!H</b>		
<i>1sy</i>	kwá'ánplòóǵù river's branch	kwá'ántìntíéǵù river's peanut
<i>2sy</i>	húo'gənpłòóǵù thorn's branch	húo'gəntìntíéǵù thorn's peanut
<b>HL</b>		
<i>1sy</i>	lwaánplòóǵù river's branch	lwaántìntíéǵù river's peanut
<i>2sy</i>	húcúunplòóǵù hat's branch	húcúuntìntíéǵù hat's peanut
<b>L</b>		
<i>1sy</i>	sùónplòóǵù place's branch	sùóntìntíéǵù place's peanut
<i>2sy</i>	nùgonplòóǵù basket's branch	nùgontìntíéǵù basket's peanut
<b>LH</b>		
<i>1sy</i>	plòónplòóǵù branch's branch	plòóntìntíéǵù branch's peanut
<i>2sy</i>	tìntíénplòóǵù peanut's branch	tìntíéntìntíéǵù peanut's peanut