Grammatical tone and underspecification in TAM inflection of Mazatlán Mazatec

Tone interactions in the noun phrase of Mazatec are simple when compared to those seen in the verb phrase. Specifically, there are floating tones on certain tense-aspect-mood (TAM) prefixes that trigger change on the tonal melody of a base, e.g. Zimmerman (2017); however, the type of tone change that is triggered is not predictable by the surface tone of the base verb. Previous analyses of the agentive verbal systems have described them as having paradigmatic grammatical tone with high levels of inconsistency within verbal paradigms (Nakamoto 2020, Uchihara 2021). The TAM prefixes in Mazatec have different underlying tone specifications that interact with certain bases according to the general phonology and with other bases in ways not predicted by the general phonology. This underspecification, not seen in the tone of lexical stems, creates tone alternation specific to these inflectional paradigms. The restriction of this interaction to specific grammatical contexts and its absence from the general phonology shows it to be grammatical tone (Rolle 2018).

The tonal alternations seen in noun phrases are also seen throughout all phrase types in Mazatec and can be thought of as part of the general phonological system. For example, high tone on lexical stems shifts to the adjacent syllable, as seen in (1).

(1)	a.	nɜ̃ɲá	'perro'	+	ʃà	'dirty'	→	nɜ̃ɲɜ̃ ʃâ	'dirty dog'
	b.	nɜ̃ɲá	'perro'	+	t͡sʰjē	'lazy'	→	nɜ̃ɲɜ̃ t͡sʰjé	'lazy dog'
	c.	nɜ̃ɲá	'perro'	+	tsjú	'stiff'	→	nɜ̃ɲá t͡sʰú	'stiff dog'

When the adjacent tone is mid, it is replaced by the high tone of the previous word (1b) and when it is low, a high-low contour is created (1a). The tone shift is prevented if the following syllable has high tone (1a). The lack of a contour tone on the base with a mid tone can be explained by postulating an underlyingly null tone that is assigned mid by default. We describe the underlying lexical tones with two features: tone (*H* or *L*) and register (*h* or *l*), as in Register Tier Theory (Snider 1999). High tone is underlyingly *Hh*, mid is underlyingly *Ø* and low is *Ll*. Underspecified tones are assigned low tone (*L*) and/or high register (*h*); null tones are assigned *Lh,* which is realized as mid tone.

The tone shift seen in (1) is also seen in (2) with the high tone of the causative in VPs.

(2)	a.	t͡sí-	'CAUS'	+	t͡ʃāhā	'get lost'	→	t͡sīt͡ʃáhā	'loose something'
	b.	t͡sí-	'CAUS'	+	t͡sjē	'get full'	→	t͡sītsjé	'fill something up'
	c.	t͡sí-	'CAUS'	+	kánɡī	'fall'	→	t͡síkánɡī	'make something fall

No verbs in the class that these verbs belong to have low tone in their base. The high tone of the causative shifts onto both verbs with mid tone (2a & 2b) and is blocked by the base that begins with high tone (2c).

The high tone on the progressive *sé-* interacts differently with these verb bases.

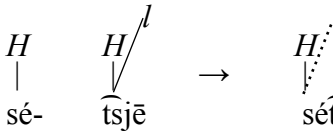
(3)	a.	sé-	'PROG'	+	t͡ʃāhā	'get lost'	→	sēt͡ʃáhā	's/he/they are getting lost'
	b.	sé-	'PROG'	+	t͡sjē	'get full'	→	sétsjē	's/he/they are getting full'
	c.	sé-	'PROG'	+	kánɡī	'fall'	→	sékángī	's/he/they are falling'

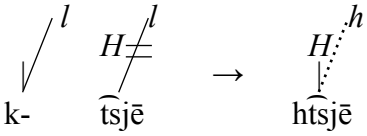
One mid tone base receives the prefix high tone shift (3a), while the other mid tone base resists the high tone shift (3b).

It is possible that the mid tones in *t͡ʃāhā* 'get lost' and *t͡sjē* 'get full' are structurally distinct, that the high tones in the causative *tsí-* and the progressive *sé-* are distinct, or both. I argue that both are true. The high tone of the causative and progressive are necessarily distinct because of their divergent interactions with the verb *t͡sjē* 'get full'. I propose that the high in the causative is the fully specified *Hh* and the high on the progressive is underspecified for register and is simply *H*. In being underspecified, it can only shift onto *Ø* tone stems (3a), but not stems that have an underlying specification, as shown in (5). I propose that the specification for the mid tone in *t͡sje* 'get full' is not *Ø*, but *Hl,* which prevents the shift of *H*. This *Hl* specification also helps explain the unexpected tone interaction of the floating low tone on these two distinct stems with mid tone, when they combine with the future prefix, as shown in (4).

(4) a. k-① 'FUT' + t͡ʃāhā 'get lost' → ht͡ʃàhā 's/he/they will get lost'
b. k-① 'FUT' + t͡sjē 'get full' → ht͡sjé 's/he/they will get full'

The low tone docks onto the TBU unspecified for tone in (4a) while it dissimilates to a high tone in (4b). As the high tone in the progressive *sé-* was underspecified for register, the floating low tone of the future prefix is underspecified for tone, *l*. When the *l* register interacts with the *Hl* of *t͡sje* 'get full', it triggers a **ll* OCP violation, see (6).

(5) 

(6) 

Rather than dock onto the base, the floating *l* triggers a **ll* OCP violation which is resolved by dissimilating to a *h* register, as seen in (6).

This analysis motivates two asymmetries in the phonological system of Mazatec: 1) the distinct tone interactions in TAM verbal paradigms are due to underspecified tones seen on the inflexional prefixes, tones not seen on lexical stems and 2) the inclusion of an *Hl* melody creates a third underlying tone in the inventory for verbs: *Ø, Hl*, and *Hh.* Two of these tones, *Ø & Hl*, are realized as mid tones in the habitual, but interact differently with underspecified inflectional tones. All lexemes, then, have 3 possible tone specifications in their inventory, albeit different: for verbs, *Ø, Hl*, and *Hh* and for other lexical stems, *Ll, Ø* and *Hh*. This analysis economically accounts for difficult tone questions in stative verbs.

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