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Grammatical and lexical sources of allomorphy in Amuzgo inflectional tone

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Abstract

Amuzgo (Otomanguean: Mexico) has a large inventory of lexically arbitrary tonal inflection classes in person/number paradigms, where inflectional tones overwrite the root's lexical tone. In causatives, however, inflectional tones are predictable from phonological properties of the root, primarily lexical tone. The inertness of root inflection classes in causatives is argued to follow from cyclicity: once the causative Voice head triggers spell-out, lexical inflection-class specifications are no longer visible, and only phonological information can condition allomorphy in the outer domain of person/number agreement. The grammatical behaviour of inflectional tone thus reflects its structural morphosyntactic position, as distinct from its linear phonological one. I distinguish between several possible analyses of phonologically conditioned tonal-overwriting allomorphy, and propose that the Amuzgo case involves constraint-mediated competition among a priority-ranked list of allomorphs in the input, rather than creation of tonal allomorph candidates purely within the phonology or subcategorisation frames in the lexical representations of allomorphs.

Contents

1. Introduction

A prominent issue in grammatical tone is the resolution of competition between conflicting tonal specifications (Inkelas 1998; Hyman 2016; McPherson & Heath 2016; Rolle 2018). Generally, such conflicts arise because different morphosyntactic categories seek to realise their tones on the same host, which cannot simultaneously bear both of them. For example, McPherson & Heath (2016) analyse Possessive–Noun–Adjective constructions in Dogon, where each modifier potentially assigns a different tonal melody to the noun.

This article introduces a novel type of apparent conflict: where the same grammatical trigger controls two different systems of grammatical tone assignment, and the choice between them depends on the morphological structure of the target word. This situation arises in person/number marking in Amuzgo, an Otomanguean language of southern Mexico. The main system of tonal inflection is based on a large number of lexically arbitrary tonal-inflection classes (Kim 2016; Palancar 2021). However, in derived causatives, the tones associated with a root's inflection class do not surface; instead, we find a system of phonologically conditioned allomorphy that is driven primarily (though not exclusively) by the underlying lexical tone of the verb root. While the suppression of lexically determined inflectional tones in Amuzgo causatives is mentioned by Kim & Sande (2020) and Sande (2020), the causative pattern itself has not previously been described or analysed.

Here, I propose that Amuzgo has a default system of phonologically conditioned allomorphy for tonal person-marking, which emerges in the causative but is overridden by lexical specifications in morphological contexts where inflection-class information is visible. Following Embick (2010) and others, I observe that in cyclic spell-out, morpholexical information, such as inflection-class specifications, is lost once a root is spelled out. Thus, grammatical contrasts can arise from the presence versus absence of phase heads within the structures of morphologically related words (see e.g. Alexiadou 2014: 26). In causatives, the Voice head triggers spell-out so that only phonological material is visible to person marking on the structurally higher level, and the default morphology applies. In contrast, non-causatives do not have any spell-out trigger between the root and person marking, so inflection-class specifications are still present and visible at the stage where person-marking tones are assigned. This locality effect confirms the expectation that grammatical tone – despite its nonlinear manifestation – should reside structurally in the position determined by its morphological category or function.

Phonologically conditioned tonal allomorphy in Amuzgo is additionally noteworthy in that the underlying tone conditions the tonal allomorph that overwrites it, yielding surface opacity. This is unlike cases where the conditioning tone is present and surface-adjacent to the inserted tone, such as in Seenku (McPherson 2019), but similar to cases like Guébie scalar tone shift (Sande 2018) where underlying tones are replaced, and input–output relationships must therefore be evaluated. I distinguish between approaches to phonologically conditioned tonal-overwriting allomorphy, which differ along two parameters: where tonal allomorphs originate, and how they are matched with their correct context. Tonal allomorphs may, like other kinds of allomorphs, be listed in the lexicon. However, uniquely to non-concatenative morphology,

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they may also result from phonological operations performed by GEN in the generation of candidates: to the extent that the constraint ranking selects winners in different contexts that have undergone different operations, the phenomenon of allomorphy manifests itself across surface forms. Regarding the matching of each allomorph to its correct context, one possibility is that allomorphs bear lexical subcategorisation requirements allowing them to attach or surface only in specified contexts (Paster 2006; Bye 2007). Alternatively, they may all be present disjunctively in the input, with the optimal allomorph being adjudicated by the constraint ranking (e.g. Rubach & Booij 2001; see also Nevins 2011).

For Amuzgo, I argue that tonal allomorphs are indeed listed, and present disjunctively in the input. Despite the initial appearance that inflectional tones can be generated by replacement operations in the phonology, their distribution has some quirks which make it problematic for a single constraint ranking to select the optimal input–output mapping across phonological contexts. Nevertheless, because the quirks – while systematic – play a minor role compared with phonological input–output faithfulness, a subcategorisation approach misses significant generalisations by stipulating all of the mappings. Instead, I follow Mascaró (2007) and Bonet *et al.* (2007) in representing the allomorphs as a list in the input that is ranked in terms of preference. This approach handles the assignment of default inflectional tone in a more flexible way than tonal markedness constraints, while still enabling the grammar to capture the phonological generalisations that underlie allomorph selection. I develop an analysis within Cophonology Theory (Orgun 1996; Inkelas & Zoll 2007), in which morphological exponence is determined by Optimality-Theoretic constraint rankings, and each morphological category can have its own grammar. This model is well suited to Amuzgo, both because the tonal morphology relies on principles of phonological faithfulness and markedness, and also because there are differences between morphological categories in how phonological criteria contribute to determining the output.

This article discusses the Amuzgo language as spoken in San Pedro Amuzgos in the Mexican state of Oaxaca (ISO 639-3: azg; Glottolog: sanp1260). The examples in §2 have been taken from the dictionaries by Tapia García (1999) and Stewart & Stewart (2000), but the majority of the data are from an extensive manuscript by native-speaker linguist Fermín Tapia García, cited as Tapia García (n.d.), which contains the full conjugational paradigms of around 1,000 verbs, including 285 causatives.[1] Each verb in this article is accompanied by a numerical reference to the page of the original manuscript where its paradigm is found. Approximately one-third of the manuscript was reviewed by myself together with Tapia García in his home in San Pedro Amuzgos during visits in 2012 and 2013, and confirmed to be accurate apart from obvious typographical errors (e.g. non-existent tone '24' instead of intended '35'), which were rectified. On this basis, we may consider the dataset as a whole to be reliable. Part

[1] Palancar (2021) extracts 290 causatives from the same source. The slight discrepancy most likely arises from differences in the counting of homophonous roots with identical inflectional properties that appear in multiple lexical items, for example, in combination with different prefixes – as in (9) – or in phrasal verbs. Thus, counts will naturally differ since there are multiple valid criteria that could be used. My count of 285 refers to distinct roots, and reflects an original list of 298 from which 13 apparent duplicate roots were manually pruned.

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of the dataset is online in searchable format in the Surrey Morphology Group's Oto-Manguean Inflectional Class Database (Feist *et al.* 2015).

The structure of the article is as follows. In §2, I provide background information on the tonal system of Amuzgo and summarise previous research on tonal inflection. In §3, I describe the novel patterns of tonal inflection in causatives and their interaction with lexical inflection-class specifications. I show that the tonal allomorphs are phonologically conditioned, but should be considered as suppletive as they are not derivable via concatenation of a single exponent. The analysis is laid out in §4, and §5 concludes with some reflections on wider implications for the phonology–morphology interface and the typology of grammatical tone.

2. Tones and tonal inflection classes in Amuzgo

2.1 Tone system

The Amuzgo variety of San Pedro Amuzgos has eight lexically contrastive tones (Smith-Stark & Tapia García 1984; Stewart & Stewart 2000). The phonetic characterisations of the tones are consistent between Smith-Stark & Tapia García (1984), who use numbers 1 (low) to 5 (high) to label them, and Stewart & Stewart (2000), who use a(lto) 'high', m(edio) 'mid' and b(ajo) 'low'. I will use the primitives H (high), M (mid) and L (low). The representations used in this article are set out in Table 1, along with the corresponding representations in previous work.[2]

While the exact phonological representations of the tones are still up for debate, a few generalisations can be made. First, it appears that H, M and L are structurally the most basic tones. They are the only tones attested on syllabic nasals (Smith-Stark & Tapia García 1984: 211), in noun-classifier prefixes (Buck 2000: 391) and TAM and other verbal prefixes,[3] and with a few exceptions they are the main ones found on

Table 1. *Amuzgo tones.*

		This article	Tapia García	Stewart & Stewart
Level	High	H	5	a
	Mid	M, M+	3, 34	m, m-m
	Low	L, L+	1, 12	b, b-b
Contour	Falling	HM, HL	53, 31	am, ab
	Rising	MH	35	ma

[2]It is important to mention that the phonetic characterisations of the tones reflect the speech of older generations: native-speaker linguist Tapia García was born in 1936, and I have been told by people in the community that Stewart & Stewart (2000) worked with speakers of a similar age. Kim (2011), working with a speaker born in 1983, shows that the eight contrastive tones are intact, but have rather different phonetic realisations, which are similar to those in the seven-tone system reported by native-speaker linguist Hernández Hernández (2019).

[3]Although Buck (2000: 447) lists an instance of the verbal prefix *va-* as HM instead of its usual M, Tapia García (n.d., 509) lists the same word as beginning with $ʔ^{H}$-va^{M}. It is possible that the initial glottal

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function words and clitics. Of the 501 monosyllabic nominal and adjectival headword entries in the Stewart & Stewart (2000) dictionary, 120 have H tone, 129 have M tone and 91 have L tone; there is then a large gap, with next most frequent tone being MH (37 words).

Within the Mid and Low levels, I distinguish between what I will call ‘simple’ M and L, and ‘augmented’ M+ and L+. The simple tones have shorter duration and are slightly falling in phrase-final position, while the augmented tones have longer duration and, at least phrase-finally, a slight rise following a flat level realisation (Smith-Stark & Tapia García 1984; Kim 2011). I claim that the simple–augmented distinction boils down to a single tone cross-cut by some other word-prosodic distinction, whose exact nature is not yet established. An analysis of this type exists in Xochistlahuaca Amuzgo, discussed by Bauernschmidt (1965) in terms of ‘controlled’ versus ‘ballistic’ syllables and considered by native speaker Jair Apóstol Polanco (p.c.; see also Apóstol Polanco 2014: 36) to possibly be a length distinction. The case for a controlled/ballistic or length contrast is less clear for the San Pedro Amuzgos variety (see Smith-Stark & Tapia García 1984: 206, 213; Buck 2000: 372; Kim 2011). However, it is worth noting that in the seven-tone system described for some speakers in San Pedro Amuzgos by Hernández Hernández (2019), examination of cognates suggests that the loss of one tonal category is due to a merger between etymological M and M+.

At any rate, the M/M+ and L/L+ pairs have a close morphophonological relationship and can be assumed to share some part of their representation. As discussed by Smith-Stark & Tapia García (1984: 213), there is a construction that variably forms the 3SG possessive of some nouns, modifies nouns when they appear in compounds, and/or derives property-concept words from nouns (see Francez & Koontz-Garboden (2017) on the possible relationship between these categories). It is formed by adding a final glottal stop if not already present, and in the case of M and L, changing the tone to M+ (in (1a) and (1b)) and L+ (in (1c) and (1d)). In contrast, H does not change, as seen in (1e) and (1f). There is not yet enough data to generalise about what happens to other tones.

(1) *Tones in morphologically basic and derived words*

	Basic noun		Derived form	
a.	hmĩʔ^{M}	‘heat, hot’	hmĩʔ$^{M+}$	‘hot-tempered’
b.	stõ^{M}	‘box’	stõʔ$^{M+}$	in ‘box-cadaver’ (coffin)
c.	hn^{dj}e^{L}	‘air’	hn^{dj}eʔ$^{L+}$	‘voice (of someone)’
d.	tʃõ^{L}	‘fire’	tʃõʔ$^{L+}$	in ‘fire-thunder’ (lightning)
e.	nda^{H}	‘water’	ndaʔ^{H}	‘wet’
f.	βʔa^{H}	‘house’	βaʔ^{H}	‘his/her house’

Another morphophonological alternation between simple and augmented tones arises in plural paradigms. While the lexical tone of the plural stem surfaces in the 2PL and 3PL forms, and it can be any of the eight tones (although HL is very rare in this context; see Palancar 2021: 54), the first-person inclusive form (1INCL) can, with very

stop (usually realised with a very brief voiced high or mid front-vowel release that bears the tone) was not noticed, or that there was a process of tonal simplification or coalescence. Either way, *va-* has lexical M tone.

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few exceptions, only bear H, MH, M+ or L+. (The first-person exclusive is invariably assigned HL tone.) The tonal restrictions on the IINCL give rise to regular alternations where we find M or L tone in the 2PL and 3PL forms, but M+ and L+ in the IINCL form. Some examples of the alternation are shown in (2).[4]

(2) *M/M+ and L/L+ alternations in plural paradigms (completive forms)*

	IINCL	2PL/3PL	Gloss	Page in Tapia García (n.d.)
a.	tʔã$^{M+}$	tãʔ^{M}	‘cut, slice’	TG 651
b.	tã$^{M+}$	tã^{M}	‘ask for’	TG 665
c.	hnɔ̃$^{L+}$	hnõ^{L}	‘sow’	TG 650
d.	tkɛ̃$^{L+}$	tkẽ^{L}	‘put on the ground’	TG 680

Finally, there is evidence that the contour tones are composed of H, M and L primitives. Evidence for HL being composed of H and L comes from Spanish loanwords, which are assigned an H-L melody anchored to the syllable that is stressed in Spanish, and M on any pretonic syllables. (Though a few loanwords of Spanish origin take M-L melodies, (M)-H-L is the dominant pattern.) In (3a), we see that the melody surfaces as an HL falling tone on words with final stress in Spanish, while in (3b), words with penultimate stress in Spanish receive an H tone followed by an L tone.

(3) *Tone in Spanish loanwords*

a. *Final stress*

i.	su^{HL}	‘blue’ (< *azul*)
ii.	a^{M}bri^{HL}	‘April’
iii.	ba^{M}lõ^{HL}	‘balloon’

b. *Penultimate stress*

i.	nai^{H}lo^{L}	‘nylon’
ii.	a^{M}go^{H}sto^{L}	‘August’
iii.	ka^{M}mi^{H}sa^{L}	‘shirt’

There is one example of a Spanish loan that supports MH as being composed of M and H: the word pe^{MH}to^{L} ‘handkerchief’, from Spanish *pañuelo* (with penultimate stress), has segmentally reduced the first two Spanish syllables – which would be expected to receive M and H by the pattern in (3) – into one, which has an MH rising tone.

Another piece of evidence that the MH rising tone ends in H comes from incipient tone sandhi among younger speakers, described by Kim (2011). Following an H tone, an L tone is realised allophonically as super-high, represented in (4) as S. The sandhi is triggered by both H and MH, and only by those tones.

(4) *Raising of L tone after H*

a.	nthaʔ^{H}	tʔũã^{L}	→	nthaʔ^{H} tʔũã^{S}	‘big flower’
	flower	big			
b.	ŋgua^{MH}	n^{dj}e^{L}	→	ŋgua^{MH} n^{dj}e^{S}	‘tall pots’
	pot.PL	tall			

[4] For clarity, only the stems are shown here, but the 2PL and 3PL forms include obligatory person/number suffixes or enclitics. Many speakers reject the stems as invalid in the absence of those morphemes.

For the falling HM tone, we find natural-class behaviour of HM and M in a morphophonological process of glottally conditioned tone lowering posited by Kim (2016). With verb stems of the shape CVʔ, concatenation of the normal 2SG suffix *-ʔ* would yield a 'double glottal' configuration CVʔ-ʔ.[5] In these contexts, only a single glottal stop is pronounced, but an HM inflectional tone surfaces as HL, and an M inflectional tone surfaces as L. The parallelism of the M → L change in both tonal categories, whether it affects the entire tone or only the second half, supports the common representational element.

A final possible source of evidence for contour and augmented tone representations comes from the reduced forms of some nouns, which are found as nominal classifiers or in compound-like contexts (Smith-Stark & Tapia García 1984: 212). The reduced forms feature segmental reduction of laryngealised vowels (ʔV → V), monophthongisation of diphthongs and, in the available examples, tonal reduction of contour to level tones, as in (5a) and (5b), or augmented to simple, as in (5c).[6] Although the productivity of these patterns is unclear, and a purely phonetic or diachronic explanation cannot be ruled out, the tonal alternations are at least consistent with the representations posited, in that the simplifications are always to one of the primitives already present in the full form. Meanwhile, there are at least three examples each of the basic tones H and L surfacing identically in the full and reduced word forms, as in (5d) and (5e), even where there are segmental changes.[7]

(5) *Full and reduced forms*

	Full	Reduced	Gloss
a.	tsʔã^{HM}	tsã^{M}	'person'
b.	ʃua^{MH}	ʃɔ$^{M+}$	'pot'
c.	tʃa^{M+}	tʃa^{M}	'tortilla'
d.	tsʔõ^{H}	tsõ^{H}	'wood, tree'
e.	tsɔʔ^{L}	tsɔʔ^{L}	'cup; concave'

This excursus into tonal representations has been necessary as a foundation for the analysis of morphological tone. Especially given the complexity of the Amuzgo tone system, it is only with some degree of confidence in the representations that we can diagnose tonal overwriting and suppletive allomorphy as opposed to integration of floating tones, as we will see presently in §2.2. It is possible that future work on even more atomic tonal features will be able to characterise some of the morphological tone groupings seen below in terms of phonological natural classes, but for the time being, we now have a sufficient grasp of the tones to be able to proceed.

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[5]Among CVʔ surface forms, it is not trivial to distinguish which come from a CV stem with -*ʔ* suffix, and which come from CVʔ stem with a *-ʔ* suffix, but see Kim (2019) for criteria and analysis.

[6]The alternations in (5a) and (5c) are only found in Stewart & Stewart (2000). In Tapia García (1999), the M+ tones appear identically in compounds.

[7]Aside from the examples shown, there are *nda*^{H} 'water', *kio*^{H} 'animal', *ʃho*^{L} 'metal' and *tɛ*^{L} 'fruit'.

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2.2 Tonal inflection

In the Amuzgo of San Pedro Amuzgos, inflectional tones are used in person/number marking in all transitive and some intransitive verbs, alongside other mutations in glottalisation and vowel height (Buck 2000; Kim 2016, 2019; Palancar 2021). The remaining intransitives inflect exclusively via person/number enclitics, with no phonological changes to the stem (see Buck 2000: 376, and the more extended analysis in Smith-Stark & Tapia García 2002).

Our focus will be on singular forms. Here, the lexical tone of the root surfaces in the 3SG, but is replaced in the 1SG and 2SG forms by tones that are determined by the root's membership in a lexically arbitrary inflectional class (Kim 2016; Palancar 2021). The sub-paradigms in (6) show four different verbs that all have lexical MH tone, as seen in the 3SG, but which take different tones in the other persons. As we can see from the representations, the tonal changes may be drastic, and there is no obvious way in which the lexical tone is preserved in either the 1SG or 2SG forms. We thus follow Kim (2016) in considering Amuzgo inflectional tones to be replacive, rather than resulting from combinations of lexical tones with floating tonal inflectional markers. Furthermore, note that all combinations of L and HM in 1SG and 2SG are attested, depending on inflection class, such that neither tone is an unambiguous exponent of either category (Kim 2016).

(6) *Singular paradigms of some verbs with lexical MH tone*

a. 'chew'.CPL (TG 28)
1SG hn^{d}ɛ^{L}
2SG hn^{d}ɛʔ^{HM}
3SG hn^{d}ɛ^{MH}

b. 'arrive'.CPL (TG 610)
1SG t^{j}hɛ^{L}
2SG t^{j}heʔ^{L}
3SG t^{j}heʔ^{MH}

c. 'see'.CPL (TG 277)
1SG hn^{dj}ʔia^{HM}
2SG hn^{dj}iaʔ^{L}
3SG hn^{dj}iaʔ^{MH}

d. 'hear'.CPL (TG 275)
1SG hn^{dj}i^{HM}
2SG hn^{dj}iʔ^{HM}
3SG hn^{dj}i^{MH}

The inflectional tones for person/number remain the same across all TAM categories, as there is no tonal marking of TAM. Of the eight tones in the lexical inventory, five are attested as inflectional tones in 1SG and 2SG forms: aside from L and HM, we find M, HL and L+. Again, none of these is exclusive to either paradigm cell. The tones which are never found as inflectional tones are H, MH and M+. The inventory of inflectional tones in non-causative verbs is summarised in Table 2.

Kim (2016) identifies 11 inflectional classes based on attested combinations of 1SG and 2SG tones, while Palancar (2021: 61), working with a larger sample of verbs from Tapia García (n.d.), identifies an additional 10 combinations for a total of 21. This comprises nearly all of the logically possible combinations of the five tones, appearing to create a daunting prospect for the language learner. Importantly, tonal inflection class cannot be predicted from the root's lexical tone, or any other phonological or

Table 2. *Attested and unattested inflectional tones in non-causative verbs.*

	Attested inflectional tones	Unattested inflectional tones
Simple	M, L	H
Augmented	L+	M+
Contour	HM, HL	MH

semantic factor.[8] However, by far the most common pattern is HM (1SG) / HM (2SG). It is found on 49% of verbs (275 of 558) in Palancar's sample. Throughout the article, we follow Kim (2016) in analysing surface HL tone as morphological HM, and surface L as morphological M, on most glottal-final stems in 2SG forms, due to the tone-lowering rule mentioned in §2.1 that lowers M to L in the 'double glottal' context. The same approach is taken by Palancar (2021), who goes on to identify further subregularities and implicational relationships within the inflectional system. Nevertheless, there is still a significant irreducible core of arbitrariness and complexity in the tonal inflection of singular forms.

Since, as we saw in (2), tonal inflection in plurals does not use overwriting as its primary mechanism, and since plural tones appear to be unaffected by morphological derivation such as causative formation, they do not participate in the phenomena of interest in this article and we will not consider them further here. However, it is important to note Palancar's (2021) finding that there are patterns and restrictions in the relationships between singular and plural lexical tones, and that inflection classes can and probably should be defined based on the entire tonal paradigm.

3. Phonologically conditioned tonal allomorphy in causatives

3.1 Inflectional tones in causatives

In contrast to the rampant lexical arbitrariness that characterises tonal inflection in the singular forms of non-causatives, the causatives display a great degree of regularity which has not previously been described in the literature. I will use the label 'causative' to refer to all verbs formed with the prefix $ts(i)^{H}$- and its allomorphs; most forms will be given in the completive, where it takes the form $s(i)^{H}$-. This prefix attaches to intransitive roots to form transitives (7a), to nouns to form verbs meaning roughly 'make [noun]' (7b), to adjectives to form verbs meaning 'cause to become [adjective]' (7c), to transitives to form transitives with an additional event (7d), and to roots that are otherwise unattested to form transitive verbs (7e). Some forms, like (7f), are decomposable but not completely transparent semantically.

[8]From the tables in Palancar (2021), one can see that not all of the inflectional classes include roots of every lexical tone. There is thus some very partial element of predictability along this dimension, which remains to be fully worked out, but which in any event cannot eliminate the need for lexical storage of inflection-class information.

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(7) *Verb formation with* tsi^{H}- *(*3SG *completive forms)*

a. si^{H}-βe^{M} 'raise, lift' (TG 764)
b. si^{H}-n^{d}hi^{H} 'write' (TG 951; cf. *n^{d}hi^{H}* 'letter, grapheme; drawing')
c. si^{H}-ʔa^{H} 'cause to become thick' (TG 1063)
d. s-ki^{H} 'feed (a pig, chicken)' (TG 1078; lit. 'cause to eat')
e. si^{H}-nẽ^{L} 'speak' (TG 926)
f. si^{H}-hn^{d}a^{L} 'buy' (TG 784' cf. *hn^{d}a^{L}* 'expensive')

Our first indication that causative inflection is based on different principles from those of non-causatives is that there are differences in the 1SG and 2SG tones across non-causative and causative forms of the same root. In (8), the verb 'sleep' takes inflectional tones L (1SG) and HM (2SG), but its causativised counterpart takes HM (1SG) and HM (2SG), which as we have seen is the most frequent inflectional pattern. Although only the 1SG tone is different, viewed against the definition of Amuzgo inflection classes as combinations of paradigmatic tones, this is a more fundamental shift in the structure of the tonal inflection.[9]

(8) *Tonal alternation between non-causatives and causatives*

a. 'sleep'.CPL (TG 451)
1SG tsɔ^{L}
2SG tsuʔ^{HM}
3SG tso^{H}

b. 'cause to sleep'.CPL (TG 872)
1SG si^{H}-ki^{H}-tsɔ^{HM}
2SG si^{H}-ki^{H}-tsoʔ^{HM}
3SG si^{H}-ki^{H}-tso^{H}

Similarly, there is a root *nõ^{M}* which always appears with prefixes. While the exact meanings of the prefixes have not yet been established, the overall meanings of the resulting verbs all have to do with locomotion. In (9a)–(9d), we see that this root determines the assignment of inflectional tones HM (1SG) and L+ (2SG) across a variety of prefixes. Yet, in all forms containing the prefix *tsi^{H}*-, shown in (9e)–(9g), the inflectional tones are M (1SG) and M (2SG). In all these lexemes, the 3SG root tone is M.

(9)

	1SG.CPL	2SG.CPL	Gloss
a.	hna^{M}-nɔ̃^{HM}	hna^{M}-nõʔ$^{L+}$	'run, flee' (TG 15)
b.	tʲɛʔ^{L}-nɔ̃^{HM}	ta^{M}-nõʔ$^{L+}$	'walk a little more' (TG 404)
c.	tʲɛʔ^{L}-kwe^{M}-nɔ̃^{HM}	ta^{M}-kwe^{M}-nõʔ$^{L+}$	'enter a place' (TG 388)
d.	te^{M}-nɔ̃^{HM}	te^{M}-nõʔ$^{L+}$	'access, enter' (TG 525)
e.	si^{H}-ki^{M}-nɔ̃^{M}	si^{H}-ki^{M}-nõʔ^{M}	'make run, e.g. a horse' (TG 845)

[9]The exact meaning and function of the prefix *ki^{H}*-, which sometimes appears between the causative prefix and the root, is not known. In the examples in this article, we find it in (8), arguably (9e) and in reduced form in (15), which all have meanings roughly of the type 'cause X to do Y'; but to generalise would be premature. The homophonous prefix *ki^{H}*- in (10d) may be distinct, while other causatives in Tapia García (n.d.) contain *ki*- prefixes in the same position but with different tones. Two other known prefixes pronounced *ki^{H}*- are the animal classifier and a noun plural marker. None of these should be confused with the subjunctive prefix *ki^{M}*-, which is linearly ordered before causative *tsi^{H}* such that the subjunctives of *ki^{H}*-marked causatives contain a prefix string *ki^{M}-tsi^{H}-ki^{H}*-.

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f.	si^{H}-na^{M}-nɔ̃^{M}	si^{H}-na^{M}-nõʔ^{M}	'start to run' (TG 896)
g.	s-kwe^{M}-nɔ̃^{M}	s-kwe^{M}-nõʔ^{M}	'allow to enter' (TG 1115)

A systematic study of causatives reveals that, with few exceptions, their inflectional tones can be predicted from two phonological aspects of the root: its lexical tone, and, in 2SG forms, whether the stem ends in a vowel (-V) or in a glottal stop (-ʔ). I will start with the behaviour conditioned by lexical tone on V-final verbs. I continue to interpret the surface 3SG tone as the lexical tone, particularly since a significant number of *tsi^{H}*- prefixed roots are not attested outside the causative construction, which is stated by Palancar (2021: 55) to be synchronically unproductive. The identification of lexical tone in causatives receives extra support from verbs formed by *tsi^{H}*- prefixation of nouns. In these cases, the 3SG tone is always identical to the tone of the noun in isolation.

On V-final verbs, the lexical tones fall into two main groups. The first main group is shown in (10); the second main group is shown in (11). In the first group in (10), M, HM and L+ surface unchanged in the 1SG and 2SG forms, as shown in (10a)–(10c). I provisionally include HL in this group as well, although there is only one vowel-final HL verb in the sample, shown in (10d).[10]

(10) a. 'level'.CPL(TG 986)
- 1SG si^{H}-su^{M}
- 2SG si^{H}-suʔ^{M}
- 3SG si^{H}-su^{M}

b. 'dissolve'.CPL(TG 905)
- 1SG si^{H}-n^{d}a^{HM}
- 2SG si^{H}-n^{d}aʔ^{HM}
- 3SG si^{H}-n^{d}a^{HM}

c. 'char'.CPL(TG 976)
- 1SG si^{H}-nʔɛ̃$^{L+}$
- 2SG si^{H}-nʔẽʔ$^{L+}$
- 3SG si^{H}-nʔẽ$^{L+}$

d. 'stink'.CPL(TG 821)
- 1SG si^{H}-ki^{H}lu^{HL}u^{M}
- 2SG si^{H}-ki^{H}luʔ^{HL}
- 3SG si^{H}-ki^{H}lu^{HL}

Meanwhile, tones H, MH and M+ are overwritten by the default inflectional tones HM (1SG) and HM (2SG). This is illustrated in (11).[11]

(11) a. 'shrink'.CPL (TG 775)
- 1SG si^{H}-tʃhɔ^{HM}
- 2SG si^{H}-tʃhoʔ^{HM}
- 3SG si^{H}-tʃho^{H}

b. 'beat, stir'.CPL (TG 984)
- 1SG si^{H}-n^{j}ʔɛ̃^{HM}
- 2SG si^{H}-n^{j}ʔẽʔ^{HM}
- 3SG si^{H}-n^{j}ʔẽ^{MH}

c. 'widen'.CPL (TG 1008)
- 1SG si^{H}-tɔ^{HM}
- 2SG si^{H}-toʔ^{HM}
- 3SG si^{H}-to^{M+}

The odd tone out is L, which surfaces nearly unchanged, but not quite: as shown in (12), the lexical L-tone causatives verbs take L+ in the 1SG and unchanged L in the 2SG.

[10] This verb is not obviously transitive; Tapia García defines it as *apestar a carne dañada* 'stink of rotten meat'. The base ki^{H}lu^{HL} refers to the odour itself; it is listed by Tapia García (1999: 70) as an adverb and by Stewart & Stewart (2000: 147) as an adjective.

[11] A reviewer makes the interesting observation that the two main strategies – exempt from inflection, or use a common default – are also common in loanword adaptation.

(12) 'enrich'.CPL (TG 1012)
1SG siᴴ-tʲaᴸ⁺
2SG siᴴ-tʲaʔᴸ
3SG siᴴ-tʲaᴸ

Strikingly, the division between tones that remain unchanged (or nearly so) in inflected forms, versus tones that are overwritten by default HM, is identical to the division in Table 2 between the tones that are used in 1SG and 2SG forms in the inflection-class system, versus the tones that never appear in those paradigm cells. Taking this observation a step further, we may make this generalisation: in causatives, the lexical tone remains unchanged in the 1SG and 2SG if it belongs to the inventory of inflectional tones; otherwise, it does not surface in those forms, and is replaced by a valid inflectional tone, which defaults to the most frequent one, HM. Only the change of L to L+ – albeit minimal and possibly not replacive – finds no clear motivation, since L is attested as a 1SG tone. Out of 179 vowel-final verbs, there are only three exceptions to the pattern just described; we may consider these to be lexically fossilised.

For ʔ-final verb stems, inflectional tone in the 1SG is determined in the same way as just described, albeit with some exceptions: M, HM and most L+ (9 out of 12) verbs are unchanged; L changes to L+ and H, MH and about half of M+ verbs (11 out of 20) are overwritten by HM. Again, HL verbs are rare: there are only two; one of them stays unchanged, as in the vowel-final case.

The deviations[12] from the vowel-final pattern have some internal consistency: all of the remaining three (out of 12) L+ verbs take 1SG HM (rather than L+). All of the remaining nine M+ verbs (out of 20), and the other HL verb (of the two), take 1SG M (rather than HM). We will set these aside for now, but return to them in §4.1.

On the other hand, the 2SG forms of ʔ-final verbs work differently from the vowel-final verbs, but they are still regular. Except for verbs with underlying L tone, all 2SG forms are marked with surface HL, which, as noted above in conjunction with the glottally conditioned tone-lowering rule, can be interpreted as morphological HM in this context. The examples in (13) show the combination of unchanged 1SG tone with glottally triggered HL in 2SG, for causatives with lexical M (in (13a)) and L+ (in (13b)). The 1SG forms in (13c) and (13d) contain an echo vowel whose conditioning is not fully understood, but it does not affect the tone on the main root syllable.

(13) a. 'return' (TG 961)
1SG siᴴ-ntkwʔɛᴹ
2SG siᴴ-ntkweʔᴴᴸ
3SG siᴴ-ntkweʔᴹ

b. 'remove' (TG 1024)
1SG siᴴ-tʲkʔiaᴸ⁺
2SG siᴴ-tʲkiaʔᴴᴸ
3SG siᴴ-tʲkiaʔᴸ⁺

c. 'form lines' (TG 904)
1SG siᴴ-ntʃuʔᴴᴸuᴹ
2SG siᴴ-ntʃuʔᴴᴸ
3SG siᴴ-ntʃuʔᴴᴸ

d. 'unite' (TG 1005)
1SG siᴴ-thõʔᴴᴹɔ̃ᴹ
2SG siᴴ-thõʔᴴᴸ
3SG siᴴ-thõʔᴴᴹ

[12] Beyond what is described here, there are only two further exceptions among the glottal-final verbs: one H verb and one MH verb, which both take 1SG M tone. Again, these may be considered to be idiosyncratic; that particular MH verb, for example, takes the same inflectional tones as its non-causative counterpart.

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Table 3. *Summary: inflectional tones in causatives.*

Lexical tone	1SG tone -V	2SG tone -V	1SG tone -ʔ	2SG tone -ʔ
M	M	M	M	HL
L+	L+	L+	L+ (some HM)	HL
HM	HM	HM	HM	HL
HL	HL	HL	HL (or M)	HL
H	HM	HM	HM	HL
MH	HM	HM	HM	HL
M+	HM	HM	HM (some M)	HL
L	L+	L	L+	L

Despite the uniformity of HL tone on ʔ-final stems in the 2SG, notice that verbs with lexical tones M and L+ end up being the only ones in which the 2SG surface tone differs between V-final and ʔ-final stems. Since HM and HL neutralise to HL in the double-glottal context, (13c) and (13d) show that we get surface HL on all 2SG forms of verbs with these lexical tones, regardless of whether the lexical tone is unchanged (as in V-final verbs) or overwritten by a default HM. Similarly, verbs with underlying H, MH or M+ tone end up with surface HL in the 2SG forms under either scenario, since surface HL is the result of both default tone assignment and ʔ-final tone assignment.

The final piece of the pattern is that, again, L is the odd tone out. Instead of assigning HM to the 2SG forms of ʔ-final verbs, it simply keeps the lexical L. The verb 'call attention' in (14) shows that the inflectional tones on a ʔ-final verb are identical to those on the L-tone, V-final verb in (12). Whatever mechanism assigns morphological HM to ʔ-final verbs in the 2SG, it will need to exclude verbs with lexical L tone.

(14) 'call attention' (TG 1018)
1SG si^{H}-$t^{j}ʔia^{L+}$
2SG si^{H}-$t^{j}iaʔ^{L}$
3SG si^{H}-$t^{j}iaʔ^{L}$

Table 3 summarises the phonological conditioning of inflectional-tone allomorphs in causatives. The pattern meets the standard definition of phonologically conditioned allomorphy (e.g. Nevins 2011) as a set of morphological alternations that is predictable from the phonological environment, but which must be considered in terms of selection between multiple underlying allomorphs, rather than as the result of phonological operations performed on a single underlying morpheme.

Out of the 285 causative verbs in Tapia García (n.d.), there are 18 exceptions to the main patterns in Table 3, meaning that about 94% of causative verbs display predictable phonologically conditioned tonal allomorphy. Table 4 gives a quantitative overview of regular and irregular inflection by lexical tone and vowel- versus glottal-final status. Of the exceptions, we have set aside 5 as idiosyncratic (see the paragraph following (12), and footnote 12) and flagged 13, noted parenthetically in Table 3 and shaded grey in Table 4, as potential subpatterns. The existence of some exceptions is

Table 4. *Loci of regularity versus irregularity.*

Lexical tone	-V#, reg.	-V#, irreg.	-ʔ, reg.	-ʔ, 1SG irreg.
M	34	–	13	–
L+	9	1	9	3
HM	13	–	12	–
HL	1	–	1	1
H	51	1	20	1
MH	20	–	10	1
M+	15	–	10	9
L	33	–	16	–

perhaps not entirely surprising, given that Amuzgo causative formation is no longer productive, and that morphologically complex words may have followed different diachronic paths relative to the emergence of the now-regular inflectional patterns.

An open question is whether the causative prefix is the only morpheme in Amuzgo that triggers the phonologically conditioned tonal allomorphy that we have just seen, or whether there are others. As noted by Palancar (2021: 55), some other derivational prefixes evident in Tapia García (n.d.) include *ndi*^{H}- (inchoative), *βaʔ*^{L}- (motion), *βa*^{M}- and *βa*^{H}- (meanings not yet established). Of these, it appears that lexical inflectional class is visible in verbs with *βaʔ*^{L}- (motion), exemplified by (9b) and (9c), albeit with the suppletive completive allomorph of this prefix. However, more data will be needed to determine if there is a consistent pattern with other prefixes. Many verbs with these prefixes belong to the intransitive group that inflects solely with enclitics and no tonal changes; others form multiword constructions where person and number are marked on a subject noun (e.g. possessives on body-part nouns) and the verb itself only inflects for third person. Additional prefixes may yet come to light, since very little is known about the morphosyntax of Amuzgo. An important question is to establish why some prefixes in Amuzgo (so far, the causative) appear to initiate phasal domains, while others, including the ones evident in (9), do not.[13]

3.2 Interaction with inflection-class specifications

If the grammatical algorithm that yields this allomorphy is the one triggered by 1SG and 2SG features, then presumably the same grammar applies regardless of whether the verb is causative or not.[14] The puzzle, then, is how and why the system of phonologically conditioned allomorphy is not evident in non-causatives, and how to reconcile the 1SG and 2SG cophonologies with the contexts where inflectional tone appears to be entirely determined by lexical inflection class. Put another way, if we consider the causative patterns to be the ‘regular’ inflection, and the lexical inflection

[13] For example, Heaton (2016) found that in the Mayan language Kaqchikel, motion affixes pattern morphologically with inflection.

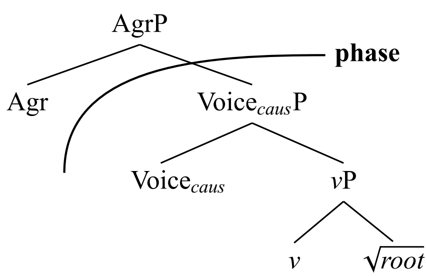
[14] I assume that the intransitives which inflect with enclitics and no stem changes have a distinct morphosyntactic structure that is not associated with the constraint rankings presented in this article.

classes to be ‘irregular’, then we ask why irregular inflection is suppressed in the causatives. The phenomenon is somewhat reminiscent of how the derived English verb *grandstand* takes regular past-tense inflection to form *grandstanded* rather than **grandstood* (see Kiparsky 1982: 10).

A key observation is that the tonal inflection of Amuzgo causatives displays two characteristics that are predicted by cyclic models of grammar to go hand in hand: allomorphy is conditioned by phonology, and morpholexical information appears to be invisible. This type of pattern was pointed out by Bobaljik (2000) to follow automatically in cases where the base has already been spelled out, ‘using up’ its morphosyntactic features and existing only as a phonological object for subsequent rounds of derivation. Much subsequent empirical work has converged on the basic generalisation that allomorphy tends to be conditioned by morphosyntactic features of structurally higher or ‘outer’ domains, and only by phonological features of lower or ‘inner’ domains (see e.g. Embick 2010; Bonet & Harbour 2012).

At first glance, this does not seem to help us much: person/number agreement is sensitive to phonology in causatives, and inflection-class specifications in non-causatives, but the structural direction of interaction is the same. However, it has been found that spell-out does not generally occur after the addition of each individual piece of structure, but rather it tends to proceed via chunks, with each phase head potentially triggering the spell-out of multiple projections in a local domain (Merchant 2015; Deal & Wolf 2017). In Amuzgo, there is a crucial difference between the two contexts, which is that causatives contain a Voice head intervening between the root and the projection, for example, Agr, where person/number features are located. Following Kim & Sande (2020: 94), an indicative structure for causatives is given in (15).[15] Voice has been posited to trigger spell-out in a number of languages (Schäfer 2008); in other words, it may act as a phase head. The consequence of this in Amuzgo would be that causative stems have already been spelled out and are visible only as phonological objects to person/number marking, due to the presence of the phase head; inflection-class information has been lost. In contrast, non-causative stems do not contain a phase head, so they are represented purely in terms of morpholexical features – including inflection-class specifications – at the point where person/number agreement is added.

(15)



Further Amuzgo-internal evidence for Voice as a phase head comes from irregular stem allomorphy. Going back to (8), the 2SG form of ‘sleep’ has an irregular stem

[15]The phase boundary is shown here above VoiceP. Depending on one’s assumptions about the nature of phases, it would also be possible to place the boundary above the *v*P complement to Voice without affecting the analysis.

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tsu-, with a high vowel rather than the mid vowel that is apparent in the 1SG and 3SG forms. This is an irregular alternation: the vowel qualities in 2SG and 3SG forns are normally identical, as in all the examples in (6); the only regular stem-vowel alternation in Amuzgo paradigms involves the lowering of a high-mid vowel to low-mid in first-person forms, as in (6b). However, in 'cause to sleep', the 2SG stem is regular, built predictably from the form *tso-* by addition of the 2SG *-ʔ* suffix. The phasal interpretation of this alternation is that in non-causatives, person features interact with idiosyncratic lexical information, since they are spelled out together. In causatives, however, person features fail to trigger lexically idiosyncratic allomorph selection, as the stem has been realised as the default *tso-*. The existence of at least one more example like this supports a systematic explanation, although I am so far only aware of these two verbs as having both irregular stem alternations and *tsi*^{H}- derived forms. In (16), we see the pair 'drink' and 'cause to drink'. In 'drink', there is an irregular vowel alternation *ua* ~ *u* across persons. But again, in the causative, all forms are built on the 3SG *u*-stem.

(16) *Regularisation of stem allomorphs under causativisation*

a. CPL-'drink' (TG 552)		b. 'cause to drink'.CPL (TG 1131)	
1SG	t-ʔua^L	1SG	s-k-ʔu^{HM}
2SG	t-ʔuaʔ^{HM}	2SG	s-k-ʔuʔ^{HM}
3SG	t-ʔu^H	3SG	s-k-ʔu^H

A complete account of the interaction between phonologically conditioned tonal allomorphy and lexical inflection classes will require a formal analysis of how the inflection classes are represented and manifest themselves in lexical entries and/or cophonologies. One possible way to capture the dominance of lexically mediated inflectional tones over phonologically conditioned tonal allomorph selection is by high ranking of the constraint RESPECT ('Respect idiosyncratic lexical specifications'). Bonet *et al.* (2007: 918) propose this constraint to account for exceptional lexical items, but it can be extended to inflection-class specifications, which are lexically arbitrary despite their presence being a regular feature of the language. This approach allows us to have a single constraint ranking for the assignment of 1SG and 2SG tones, respectively, across contexts. The contextual differences follow automatically from whether or not there are any lexical specifications that are visible and would fall under the scope of the constraint.

4. The analysis of phonologically conditioned tonal overwriting

There are two broad classes of analytical approaches to phonologically conditioned allomorphy. Under the subcategorisation approach (Paster 2006; Bye 2007), lexical entries (or Vocabulary Items) bear a specification for the phonological environment in which they appear, and are only inserted where their requirements are met. Subcategorisation analyses work well for allomorphic alternations that, despite being conditioned by phonological factors, are 'non-optimising' in that the selected allomorph does not improve the phonological output in any obvious way over its competitors;

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subcategorisation allows the distribution to simply be stipulated. Subcategorisation is also expedient in cases where allomorphy is conditioned by phonological URs that themselves undergo changes and render allomorph selection opaque on the surface (Paster 2006).

The other main approach is to locate allomorph selection in the phonological grammar, rather than in lexical entries. Typically, in Optimality-Theoretic implementations, there are multiple inputs – one with each allomorph – and a constraint ranking chooses the output with the optimal allomorph. The constraint ranking may either be general to the language, or a morpheme-specific cophonology. Because different allomorphs are compared to each other vis-a-vis the same constraint ranking, the allomorph that wins is generally the one that creates the least offensive markedness violations; there is limited role for faithfulness.

Tonal morphology – like process morphology or floating-feature morphemes in general – raises a possible alternative to grammatical allomorph selection: that the correct allomorph is still determined by a constraint ranking, but that the allomorphs themselves are not listed in the lexicon, and so are not present in the input. Instead, they are created by phonological operations of tonal mutation or replacement within the GEN component as it generates the list of candidate outputs. Sande (2018) proposes this type of analysis for scalar tone shifts in Guébie. Because the replacement of one tone by another is surface-opaque, constraints that evaluate input–output mappings, that is, faithfulness constraints, may be crucial in determining the output.

For the phonologically conditioned allomorphy involving tonal mutations, it is important to distinguish between these analyses. In Amuzgo, I propose that tonal allomorphs are indeed listed in the input, following the standard grammatical approach. Because the creation of allomorphs purely in the phonology would rely heavily on markedness constraints against individual tones, it is not flexible enough to deal with the L-tone exceptions or with the presence of non-alternating tones on syllables other than the root syllable. However, there is a similarity to the pure-phonology analysis in that input–output faithfulness plays a key role. Relatedly, I argue that a subcategorisation analysis of Amuzgo misses too many generalisations to be viable.

4.1 Allomorph listing

I formalise the Amuzgo analysis within Cophonology Theory (Orgun 1996; Inkelas & Zoll 2007). In Cophonology Theory, each morphological category – for example, 1SG – may be associated with its own Optimality-Theoretic constraint ranking. All operations that mark the category are accomplished in tandem, regardless of whether they are transparently concatenative or involve phonological processes; there is no conceptual divide between morphology and phonology. This is an advantage in cases like Amuzgo, where, in the proposed analysis, listed allomorphs work together with constraints on phonological faithfulness.

In the inflection of causatives, the input contains the root with its lexical tone, plus a list of the candidate allomorphs, which are the five tones in the inflectional inventory. Following Mascaró (2007) and Bonet *et al.* (2007), the list of allomorphs

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is represented as a partially ordered set, with the default HM receiving special status over the other tones. Some sample inputs are illustrated in (17).

(17) *Form of causative inputs to inflectional cophonologies*

a. 1SG: tsi^{H}-su^{M} {HM > M, L+, HL, L} 'level' (TG 986)

b. 2SG: tsi^{H}-su-$ʔ^{M}$ {HM > M, L+, HL, L}

Recall the generalisation that root tones stay the same as long as they are part of the inflectional tonal inventory (the main exceptions being L and the 2SG glottal-final verbs, which we will deal with below). Thus, the main constraint that gets the correct outputs for verbs with lexical root tone M, HM, HL or L+ is a high-ranked constraint that requires input and output tones to be identical. We can call this constraint IDENT-IO-TONE.[16]

(18) IDENT-IO-TONE: Assign a violation for each syllable whose tonal melody differs from that of the corresponding input syllable.

IDENT-IO-TONE evaluates phonological form only. It does not distinguish between, for example, a lexical M tone and an M tone that was selected from the list of inflectional allomorphs. Below, in line with the evidence from §2.1, we will argue that IDENT-IO-TONE is not sensitive to the simple/augmented distinction of L/L+ and M/M+, and that these pairs are evaluated as being identical on the tonal tier.

The fact that lexical root tones H, MH and M+ are overwritten by the inflectional tone suggests a high ranking of the constraint REALISEMORPHEME (Kurisu 2001; van Oostendorp 2005), which, for Amuzgo, must force the selection of an output that bears one of the listed allomorphs. REALISEMORPHEME would then obviate the need to posit markedness constraints that explicitly ban H, MH and M+. Since we have already modelled the default status of inflectional HM by specifying an order of allomorph preference, the constraint PRIORITY leverages this ordering to favour the selection of the most highly preferred allomorph possible.[17]

(19) a. REALISEMORPHEME: 'Let α be a morphological form, β be a morphosyntactic category, γ be the set of listed exponents of β, and F(α) be the phonological form from which F(α+β) is derived to express a morphosyntactic category. Then RM is satisfied with respect to β iff F(α+β) contains a member of γ' (based on Kurisu 2001).

b. PRIORITY: 'Respect lexical priority (ordering) of allomorphs. Given an input containing allomorphs m_1, $m_2 \ldots$, m_n, and a candidate m_1' where m_1' is in correspondence with m_1, PRIORITY assigns as many violation marks as the depth of ordering between m_1 and the highest dominating morph(s)' (Mascaró 2007: 726).

[16] I assume that the phonological content of a cyclic domain may still undergo further manipulation after spell-out. See Embick (2014) for in-depth discussion of the non-identity of phasal and phonological cycles.

[17] An intriguing alternative is the possibility that the selection of HM is driven by faithfulness. The idea would be that since H, MH and M+ are not permitted, HM is – by some metric – the most faithful of the available options. Further work on the representations of Amuzgo tones, including the defining of natural classes and possibly tone features, is needed before this possibility can be explored.

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For overwriting to happen in (20), REALISEMORPHEME must outrank IDENT-IO-TONE. The constraint PRIORITY ensures that the default inflectional tone is chosen in cases where the underlying tone must be replaced by a tone from the allomorph list to satisfy REALISEMORPHEME.

(20) *Lexical H is overwritten by HM in the verb 'shrink'* (TG 775)

si^{H}-tʃho^{H} {HM > M, L+, HL, L}	REALISE MORPHEME	IDENT-IO-TONE	PRIORITY
a. si^{H}-tʃho^{H}	*!		
☞ b. si^{H}-tʃho^{HM}		*	
c. si^{H}-tʃho^{M}		*	*!

For tones in the middle of the preference ordering to surface unchanged in (21), IDENT-IO-TONE must outrank PRIORITY.

(21) *Lexical M surfaces unchanged in the verb 'level'* (TG 986)

si^{H}-su^{M} {HM > M, L+, HL, L}	REALISE MORPHEME	IDENT-IO-TONE	PRIORITY
☞ a. si^{H}-su^{M}			*
b. si^{H}-su^{HM}		*!	
c. si^{H}-su^{L}		*!	*

Here, we can note that whereas the original formulation of REALISEMORPHEME in Kurisu (2001) penalises null exponence, that is, cases where F(α+β) = F(α) phonologically, the version in (19a) simply requires the output to contain one of the tones in the set {HM > M, L+, HL, L}, so REALISEMORPHEME can be satisfied even where the tone is identical to that of the base, uninflected form. The formulation in (19a) is not without its technical issues, although the issues appear to be surmountable. It may be unsatisfactory for cases in other languages where an input allomorph is subject to phonological modifications; however, abstract indices could be used to track correspondence between input and output exponents. More relevantly for Amuzgo, it is a matter of luck that the causative prefix *si^{H}-* bears an H tone; in principle, an M- or L-toned prefix could cause the entire candidate to spuriously satisfy REALISEMORPHEME. Therefore, we may well want to distinguish between a lexical M_{lex} in the input and an inflectional M_{infl} from the allomorph list that docks (presumably due to other constraints, not explored here) on the root syllable of the winning output candidate. In any case, as stated, the constraint IDENT-IO-TONE must be sensitive to tonal elements only, with no identity requirement on the indices.

The analysis is still not complete. If IDENT-IO-TONE assesses M+ and M as identical, the ranking IDENT-IO-TONE ≫ PRIORITY incorrectly predicts that lexical M+ will take the IDENT-satisfying inflectional tone M, rather than the PRIORITY-satisfying

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HM. In (22), we have inserted a high-ranked constraint that penalises the mapping of augmented M+ in the input to simple M in the output. The constraint must target the mapping of augmented tones to their simple counterparts, while tolerating other output tones that do not contrast along the simple-augmented dimension. The exact, correct formulation remains pending since the representation of this dimension has not yet been established. For now, I schematically call this constraint FAITHAUG: 'Assign a violation for each simple tone (M or L) in the output which corresponds to an augmented tone in the input.'

(22) *Lexical M+ is overwritten by inflectional HM in the verb 'widen'* (TG 1008)

si^{H}-to^{M+} {HM > M, L+, HL, L}	REALISE MORPHEME	FAITH AUG	IDENT-IO TONE	PRIORITY
a. si^{H}-$tɔ^{M+}$	*!			
b. si^{H}-$tɔ^{M}$		*!		*
☞ c. si^{H}-$tɔ^{HM}$			*	

Recall from Tables 3 and 4 that there were two arguably robust groups of patterned exceptions. With the main analysis in place, we see that these subpatterns can be modelled straightforwardly as constraint rerankings. First, within the lexical M+ category, the ʔ-final verbs are split between those which take regular 1SG HM, and those which do take 1SG M, as predicted by a high ranking of IDENT-IO-TONE. The M subpattern follows from a ranking reversal in which IDENT-IO-TONE ≫ FAITHAUG. Second, within the lexical L+ category, 25% of the glottal-final verbs take 1SG HM, as opposed to the majority which take L+. This outcome corresponds to a reranking of PRIORITY ≫ IDENT-IO-TONE, so that it becomes less costly to take the preferred allomorph HM than to satisfy IDENT-IO-TONE by remaining as L+. The question remains, of course, as to the motivations behind the rerankings. The fact that the subpatterns are found in glottal-final verbs may be significant, given that glottal-stop addition is a known derivational process that can alter word prosody, as in (1), and could perhaps have played a role in the historical development of these groups of words. Synchronically, it may be possible to assign lexically specific constraint weightings, following the approach of Sande (2020); but a more detailed analysis will require further investigation of the words' internal structure and their behaviour across morphological contexts.

We now move on to the mapping, in 1SG forms only, of underlying L to augmented L+. Here again, we observe the close relationship between single and augmented tonal representations that was motivated in §2.1, and consider that the L ~ L+ alternation does not violate IDENT-IO-TONE. Additionally, for the 1SG cophonology only, we will use a markedness constraint *SIMPLE, which penalises M and L by assigning a violation for every simple tone present in the output (assuming H does not count as simple since it does not contrast for the simple/augmented distinction). The presence of *SIMPLE in the 1SG cophonology ensures that L will not surface as a 1SG inflectional tone in (23).

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(23) *Mapping of L to L+ in* 1SG *forms in the verb 'enrich'* (TG 1012)

si^{H}-tʲa^{L} {HM > M, L+, HL, L}	REALISE MORPHEME	FAITH AUG	IDENT-IO TONE	*SIMPLE	PRIORITY
a. si^{H}-tʲa^{L}				*!	*
☞ b. si^{H}-tʲa^{L+}					*
c. si^{H}-tʲa^{HM}			*!		

In the 1SG, *SIMPLE is crucial for ensuring that L does not surface. The outcome of underlying M is unaffected, because the ranking IDENT-IO-TONE ≫ *SIMPLE enables M-toned roots to surface with M tone. There are two reasons to adopt *SIMPLE as opposed to *L. First, it is not clear how *L can be made to penalise L but not L+, if their tonal representations are identical for purposes of IDENT-IO-TONE. The *L constraint would have to be the conjunction of *L and *SIMPLE, in which case we might as well adopt *SIMPLE by itself. The second advantage of *SIMPLE is that builds towards a unified first-person cophonology, by connecting the absence of L in 1SG causatives with the restriction against both M and L in the first-person inclusive: recall from (2) that in the first-person inclusive, M and L are never found, but rather always converted to M+ and L+, respectively.

One might wonder if we can simply omit L from the list of 1SG allomorphs, to prevent it from surfacing without positing an extra constraint. However, this analysis would require separate allomorph lists for 1SG in causative and non-causative contexts, since there are lexical inflection classes in non-causative contexts that do assign L on 1SG forms, as in (6a) and (6b). This move would be a reversal of the approach taken thus far, as discussed in §3.2, which has been to develop a general algorithm for the assignment of 1SG and 2SG exponents across the non-causative and causative contexts, and attribute output differences to the visibility, versus lack thereof, of lexical inflection-class specifications. Additionally, since the causative base has already been spelled out, it is not clear how to get the 1SG construction to 'see' that this is a causative form and supply a different list of allomorphs. Thus, there is a delicate balance between listing versus non-listing of tonal allomorphs, and markedness constraints against certain tones, in ruling out unattested candidates.

The last part of the regular causative pattern is the assignment of HM to glottal-final stems in the 2SG Recall from (13) that the only tones for which this makes a difference are M and L+. The problem is that M and L+ are both listed as possible allomorphs, so we infer that some constraint bans them from surfacing in the double-glottal context, channelling them down the same route as H, MH and M+ towards the selection of the default HM. We formalise the contextual ban on M and L+ as high-ranked cooccurrence constraints *M/ʔʔ and *L+/ʔʔ, pending further investigation on the representations and derivations involved in the double-glottal context. The tableau in (24) shows how a high ranking of the cooccurrence constraints produces the selection of the default tonal allomorph; the outputs are left at an intermediate stage, on the hypothesis that glottal degemination and tone lowering may be postlexical processes. The crucial ranking is *M/ʔʔ and *L+/ʔʔ ≫ IDENT-IO-TONE.

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(24) *Allomorph selection in the glottal context in the verb 'return'* (TG 961)

siᴴ-ntkʷeʔᴹ-ʔ {HM > M, L+, HL, L}	REALISE MORPHEME	*M/ʔʔ, L+/ʔʔ	IDENT-IO TONE	*SIMPLE	PRIORITY
a. siᴴ-ntkʷeʔʔᴹ		*!		*	*
☞ b. siᴴ-ntkʷeʔʔᴴᴹ			*		
c. siᴴ-ntkʷeʔʔᴹ⁺	*!				

The absence of a constraint *L/ʔʔ accounts for the systematic exception whereby L tone verbs receive L tone in the 2SG even when glottal-final.

(25) *Glottal-final verbs with L tone in the* 2SG *in the verb 'call attention'* (TG 1018)

siᴴ-tʲiaʔᴸ-ʔ {HM > M, L+, HL, L}	REALISE MORPHEME	*M/ʔʔ, L+/ʔʔ	IDENT-IO TONE	*SIMPLE	PRIORITY
☞ a. siᴴ-tʲiaʔʔᴸ				*	*
b. siᴴ-tʲiaʔʔᴴᴹ			*!		
c. siᴴ-tʲiaʔʔᴸ⁺		*!			*

4.2 Alternative analyses

In this section, I sketch out an alternative analysis in which tonal allomorphs are not listed lexically and thus not supplied as objects in the input, but rather are created in the GEN component. The output candidates are then subjected to a constraint ranking that selects the form with the correct allomorph. This approach relies heavily on construction-specific markedness constraints, which I implement within a cophonology. While it captures most of the facts, it runs into problems with the global nature of the markedness constraints, which makes them unable to target a specific syllable within the output. I conclude that while purely phonological allomorph creation is a possibility in systems of tonal replacement, it must be distinguished on a case-by-case basis from allomorph listing in the input.

The starting point behind the purely phonological analysis is the generalisation that most UR tones stay the same in causative forms, but change only when they do not belong to the arbitrary group of 'valid' inflectional tones. The constraint IDENT-IO-TONE is outranked by *H, *MH and *M+, which prevents those tones from surfacing, while other tones surface faithfully. The faithful case is shown in (26) with the 1SG completive of the verb 'level'. Candidate (26a) wins over (26b) and other candidates (not shown) created by GEN through operations of tonal deletion and insertion, that is, replacement. Presumably, candidates are generated with all possible tones.

(26)

/siᴴsuᴹ/	*H, *MH, *M+	IDENT-IO-TONE
☞ a. siᴴsuᴹ	*	
b. siᴴsuᴹᴴ	**!	*

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As we have seen, when the UR tone is not permitted to surface, the inflectional tone defaults to HM. We therefore rank *HM below all other tonal markedness constraints, to ensure that this is the one chosen if IDENT-IO-TONE must be violated. The tableau in (27) shows the 2SG. completive form of the verb 'beat, stir'. The faithful candidate (27a) loses due to having tone MH on the root syllable. Of the remaining candidates, some, like (27b), violate medium-ranked tonal markedness constraints, and so they lose to (27c), which contains the least marked inflectional tone.

(27)

/si^{H}-n^{j}ʔẽ^{MH}/-ʔ	*H, *MH, *M+	IDENT-IO TONE	*M, *L, *L+, *HL	*HM
a. si^{H}-n^{j}ʔẽʔ^{MH}	**!			
b. si^{H}n^{j}ʔẽʔ^{L}	*	*	*!	
☞ c. si^{H}n^{j}ʔẽʔ^{HM}	*	*		*

Two sets of facts remain to be handled. First, the cophonology also needs to produce an HM tone in 2SG forms where the stem ends in [ʔ]. This can be handled in the same way as in §4.1, with undominated co-occurrence constraints *M/ ʔʔ and *L+/ʔʔ. Second, for the mapping of L tone to L+ in 1SG forms, we require an adjustment to the 1SG cophonology; this was dealt with above via the constraint *SIMPLE. Here, we can promote *L to be ranked above IDENT-IO-TONE. Because the L+ candidate (28b) evades violation of *L while still satisfying IDENT-IO-TONE, it wins over the HM candidate (28c), whose violation IDENT-IO-TONE renders irrelevant the fact that it bears the least marked tone.

(28)

si^{H}-t^{j}a^{L}	*H, *MH, *M+, ***L**	IDENT-IO TONE	*M, *L+, *HL	*HM
a. si^{H}-t^{j}a^{L}	*!			
☞ b. si^{H}-t^{j}a^{L+}			*	
c. si^{H}-t^{j}a^{HM}		*!		*

In sum, the highly ranked constraints *H, *MH and *M+ essentially replicate the work of REALISEMORPHEME in the analysis in §4.1. The constraint IDENT-IO-TONE remains the same; the reader can verify that, as above, it must be outranked by FAITHAUG (not shown) to correctly predict the inflection of lexical M+ verbs. Finally, the ranking *M, *L, *L+, *HL ≫ *HM parallels the preference order in the allomorph listing.

One issue with this type of analysis is the global evaluation of markedness constraints. Because the output tones are created by GEN, rather than by selection, concatenation and docking of an autosegmental morpheme, there is no way to control the location of tonal changes. For example, candidate (27c) won because out of the two highly marked tones in the input, one of them had been changed to the least marked

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tone. However, there is nothing so far to rule out a candidate in which the first tone is changed to HM, rather than the second. The tie is shown in (29), with the novel candidate in (29a).

(29)

/si^H^nʲʔẽ^MH^/-ʔ	*H, *MH, *M+	IDENT-IO TONE	*M, *L, *L+, *HL	*HM
a. si^HM^nʲʔẽʔ^MH^	*	*		*
b. si^H^nʲʔẽʔ^MH^	*	*		*

Several solutions suggest themselves, but none is straightforward. We cannot use a ranking of FAITHTONE-AFFIX ≫ FAITHTONE-ROOT to force root tones to be the ones to change, because morphological identity is not visible after spell-out. Faithfulness to left-edge tones does not fully cover verbs whose causative forms contain additional prefixes between the causative and the root, such as those in (9e)–(9g). Some kind of antifaithfulness to right-edge tones is potentially undermined by verbs which take an echo vowel in 1SG forms, as in (13c) and (13d). Impressionistically, a possible phonological characteristic that picks out the root syllable is prosodic prominence, so it may be possible to posit high-ranked tonal faithfulness on weak syllables as opposed to prosodically strong syllables. This may work, but runs counter to the motivation and typological profile of prosodically conditioned faithfulness, which is that when there is an asymmetry, it is strong syllables that tend to have greater faithfulness.

Alternatively, we can consider swinging the pendulum away from phonological evaluation of allomorphy, and developing an analysis based on subcategorisation frames. In (30), I list the 1SG and 2SG tonal allomorphs – four tones in the 1SG due to the absence of L, and five in the 2SG.

(30) *Allomorphs with subcategorisation frames*

a. 1SG: $\text{HM}_{[\text{H, MH, M+, HM}]}$, $\text{M}_{[\text{M}]}$, $\text{L+}_{[\text{L, L+}]}$, $\text{HL}_{[\text{HL}]}$

b. 2SG: $\text{HM}_{[\text{H, MH, M+, HM, M/ʔ, L+/ʔ}]}$, $\text{M}_{[\text{M}]}$, $\text{L+}_{[\text{L+}]}$, $\text{HL}_{[\text{HL}]}$, $\text{L}_{[\text{L}]}$

The subcategorisation frames, even if one overlooks the slight awkwardness of subcategorisation for a context that is being replaced, as opposed to joined, do not really add insight to the workings of the system. More specifically, the main weakness of subcategorisation here is that it does not capture either the phonological or the morphological principles that pair lexical with inflectional tones; the pairings are arbitrary. The fact that the inventory of inflectional tones (as attested in non-causative forms) coincides with which tones change and which do not, encoded in the present analysis as REALISEMORPHEME, has no status. The key role of IDENT-IO-TONE is not stated; it is a coincidence that many of the tonal allomorphs subcategorise for an identical tone. We also lose the possibility to make a connection between the 1SG and 1INCL using *SIMPLE. Conceptually, to the extent that any of the allomorph distributions are linked by shared phonological principles, these should ideally be stated in the grammar rather than in the lexicon.

5. Conclusions

The present analysis paves the way for further study of the analytical typology of phonologically conditioned tonal overwriting. On the level of microtypology, the other Amuzgoan varieties are tonally distinct from San Pedro Amuzgos, and it follows that their grammatical tone systems must be different as well: Xochistlahuaca has an 11-way word-prosodic contrast that is underlain by six contrastive tones (Bauernschmidt 1965; Dobui 2018); Cochoapa is reported to have six tones (de Jesús García 2019); while nearby Huixtepec is preliminarily described with four tones (Coronado Nazario *et al.* 2009); and the variety of Santa María Ipalapa has not been studied. On the macro level, it remains to be worked out precisely what kinds of empirical patterns correspond to different locations in the space of possible analyses as conceptualised in §4.

Cross-linguistically, it also remains to examine the prediction that causatives should always erase inflection-class specifications unless there is some wider evidence in the language that Voice does not trigger spell-out in that language. Other cases of inflectional regularisation in causativisation include Trommer (2008) on Amharic; Germanic cases like English *shone vs. shined* and German *erschrak* 'was frightened' *vs. erschreckte* 'frightened'; and, elsewhere in Otomanguean, the causative-triggered overriding of stem classes by a class of aspectual prefixes in Zenzontepec Chatino (Campbell 2011). The prediction is valid for languages where inflection classes are demonstrably diacritic, as opposed to ones like Spanish (as analysed by Bermúdez-Otero 2013), where class distinctions are phonologically manifest in theme vowels or the like.

Overall, we have sought to clarify the space of analytical possibilities for the phenomenon of phonologically conditioned tonal-overwriting morphology, and argued that Amuzgo requires listed allomorphs in order to navigate what Bye (2015) characterises as a tension caused by allomorph distribution being rule-governed, but phonologically unmotivated. In Amuzgo, the inflectional tones of causatives can be characterised as 'morphologically conditioned phonologically conditioned morphology'. This article has traced the intricate patterns of tonal allomorphy in Amuzgo to an interacting variety of sources: lexical inflection classes, the visibility of morpholexical versus phonological information, ordered lists of allomorphs and phonological constraint ranking. In other words, the nature of the morphological conditioning, phonological conditioning and the morphology itself were all up for debate. This was largely due to the status of tone as simultaneously morphological and phonological in a way that segmental (or even arguably subsegmental) morphemes normally are not, demonstrating the value of grammatical tone for illuminating theories of the morphology–phonology interface.

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References

Alexiadou, Artemis (2014). Active, middle, and passive: the morpho-syntax of Voice. *Catalan Journal of Linguistics* **13**. 19–40.

Apóstol Polanco, Jair (2014). *Clases flexivas verbales en el amuzgo de Xochistlahuaca, Guerrero*. Master's thesis, Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS).

Bauernschmidt, Amy (1965). Amuzgo syllable dynamics. *Lg* **41**. 471–483.

Bermúdez-Otero, Ricardo (2013). The Spanish lexicon stores stems with theme vowels, not roots with inflectional class features. *Probus* **25**. 3–103.

Bobaljik, Jonathan (2000). The ins and outs of contextual allomorphy. *University of Maryland Working Papers in Linguistics* **10**. 35–71.

Bonet, Eulàlia & Daniel Harbour (2012). Contextual allomorphy. In Jochen Trommer (ed.) *The morphology and phonology of exponence*. Oxford: Oxford University Press. 195–235.

Bonet, Eulàlia, Maria-Rosa Lloret & Joan Mascaró (2007). Allomorph selection and lexical preferences: two case studies. *Lingua* **117**. 903–927.

Buck, Marjorie (2000). Gramática amuzga de San Pedro Amuzgos, Oaxaca. In Cloyd Stewart & Ruth D. Stewart (eds.) *Diccionario Amuzgo de San Pedro Amuzgos, Oaxaca*. Mexico City: Instituto Lingüístico de Verano. 361–480.

Bye, Patrik (2007). Allomorphy – selection, not optimization. In Sylvia Blaho, Patrik Bye & Martin Krämer (eds.) *Freedom of analysis?* Berlin: De Gruyter Mouton. 63–91.

Bye, Patrik (2015). The nature of allomorphy and exceptionality: evidence from Burushaski plurals. In Joan Mascaró, Maria-Rosa Lloret & Eulàlia Bonet (eds.) *Understanding allomorphy: perspectives from Optimality Theory*. London: Equinox. 107–179.

Campbell, Eric (2011). Zenzontepec Chatino aspect morphology and Zapotecan verb classes. *IJAL* **77**. 219–246.

Coronado Nazario, Hilario M., Ebenecer Coronado Nolasco, Pánfilo de la Cruz Morales, Maurilio Hilario Juárez & Stephen A. Marlett (2009). Amuzgo del sur (Huixtepec). In Stephen A. Marlett (ed.) *Ilustraciones fonéticas de lenguas amerindias*. Lima: Universidad Ricardo Palma and SIL International. 12 pp. Available at http://lengamer.org/publicaciones/ilusfon-lengalfab.php.

de Jesús García, Iván (2019). *Fonología del amuzgo de Cochoapa, Guerrero*. Master's thesis, Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS).

Deal, Amy Rose & Matthew Wolf (2017). Outward-sensitive phonologically conditioned allomorphy in Nez Perce. In Vera Gribanova & Stephanie S. Shih (eds.) *The morphosyntax–phonology connection*. Oxford: Oxford University Press. 29–60.

Dobui, Bien (2018). *Grammaire de l'amuzgo de Xochistlahuaca, une langue otomangue orientale: documentation d'une variété amuzgoane de langue en danger*. PhD dissertation, Université Paris-Sorbonne.

Embick, David (2010). *Localism versus globalism in morphology and phonology*. Cambridge, MA: MIT Press.

Embick, David (2014). Phase cycles, φ-cycles, and phonological (in)activity. In Sabrina Bendjaballah, Noam Faust, Mohamed Lahrouchi & Nicola Lampitelli (eds.) *The form of structure, the structure of form: essays in honor of Jean Lowenstamm*. Amsterdam: John Benjamins. 271–286.

Feist, Timothy, Enrique L. Palancar & Fermín Tapia (2015). San Pedro Amuzgos Amuzgo. In Timothy Feist & Enrique L. Palancar (eds.) *Oto-Manguean inflectional class database*. Guildford: University of Surrey. Available at https://doi.org/10.15126/SMG.28/1.04.

Francez, Itamar & Andrew Koontz-Garboden (2017). *Semantics and morphosyntactic variation: qualities and the grammar of property concepts*. Oxford: Oxford University Press.

Heaton, Raina (2016). Variation and change: the case of movement verbs in Kaqchikel. *IJAL* **82**. 317–352.
Hernández Hernández, Natalia (2019). *El sistema tonal en el amuzgo de San Pedro Amuzgos: Interacción entre el tono de la base nominal y los clíticos*. Master's thesis, Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS).
Hyman, Larry M. (2016). Morphological tone assignments in conflict: who wins? In Enrique L. Palancar & Jean Léo Leonard (eds.) *Tone and inflection: New facts and new perspectives*. Berlin: De Gruyter Mouton. 15–39.
Inkelas, Sharon (1998). The theoretical status of morphologically conditioned phonology: a case study from dominance. In Geert Booij & Jaap van Marle (eds.) *Yearbook of morphology 1997*. Dordrecht: Kluwer. 121–155.
Inkelas, Sharon & Cheryl Zoll (2007). Is grammar dependence real? A comparison between cophonological and indexed constraint approaches to morphologically conditioned phonology. *Linguistics* **45**. 133–171.
Kim, Yuni (2011). Algunas evidencias sobre representaciones tonales en amuzgo de San Pedro Amuzgos. [Some evidence on tone representations in the Amuzgo of San Pedro Amuzgos]. In Nora England (ed.) *Proceedings of the Conference on Indigenous Languages of Latin America – V*. Austin: University of Texas at Austin, 16 pp. Available at https://www.ailla.utexas.org/islandora/object/ailla%3A280017.
Kim, Yuni (2016). Tonal overwriting and inflectional exponence in Amuzgo. In Enrique L. Palancar & Jean Léo Leonard (eds.) *Tone and inflection: new facts and new perspectives*. Berlin: De Gruyter Mouton. 199–224.
Kim, Yuni (2019). A morphophonological parameter hierarchy for Amuzgo glottalization classes. *Amerindia* **41**. 241–272.
Kim, Yuni & Hannah Sande (2020). The division of labor between representations and co-phonologies in doubly conditioned processes in Amuzgo. *NELS* **50**. 91–100.
Kiparsky, Paul (1982). Lexical morphology and phonology. In Linguistic Society of Korea (ed.) *Linguistics in the morning calm: selected papers from SICOL-1981*. Seoul: Hanshin. 3–91.
Kurisu, Kazutaka (2001). *The phonology of morpheme realization*. PhD dissertation, University of California, Santa Cruz.
Mascaró, Joan (2007). External allomorphy and lexical representation. *LI* **38**. 715–735.
McPherson, Laura (2019). Seenku argument-head tone sandhi: allomorph selection in a cyclic grammar. *Glossa* **4**. 1–41.
McPherson, Laura & Jeffrey Heath (2016). Phrasal grammatical tone in the Dogon languages. *NLLT* **32**. 593–639.
Merchant, Jason (2015). How much context is enough? Two cases of span-conditioned stem allomorphy. *LI* **46**. 273–303.
Nevins, Andrew (2011). Phonologically conditioned allomorph selection. In Marc van Oostendorp, Colin J. Ewen, Elizabeth V. Hume & Keren Rice (eds.) *The Blackwell companion to phonology*, volume 4. Oxford: Wiley-Blackwell. 2357–2382.
Oostendorp, Marc van (2005). Expressing inflection tonally. *Catalan Journal of Linguistics* **4**. 107–127.
Orgun, Cemil Orhan (1996). *Sign-based morphology and phonology with special attention to Optimality Theory*. PhD dissertation, University of California, Berkeley.
Palancar, Enrique L. (2021). Paradigmatic structure in the tonal inflection of Amuzgo. *Morphology* **31**. 45–82.
Paster, Mary (2006). *Phonological conditions on affixation*. PhD dissertation, University of California, Berkeley.
Rolle, Nicholas (2018). *Grammatical tone: typology and theory*. PhD dissertation, University of California, Berkeley.
Rubach, Jerzy & Geert Booij (2001). Allomorphy in Optimality Theory: Polish iotation. *Lg* **77**. 26–60.
Sande, Hannah (2018). Cross-word morphologically conditioned scalar tone shift in Guebie. *Morphology* **28**. 253–295.
Sande, Hannah (2020). Morphologically conditioned phonology with two triggers. *Phonology* **37**. 453–493.
Schäfer, Florian (2008). *The syntax of (anti-)causatives: external arguments in change-of-state contexts*. Amsterdam: John Benjamins.
Smith-Stark, Thomas & L. Fermín Tapia García (1984). Los tonos del amuzgo de San Pedro Amuzgos. *Anales de Antropología* **21**. 199–220.

Smith-Stark, Thomas & L. Fermín Tapia García (2002). El amuzgo como lengua activa. In Paulette Levy (ed.) *Del cora al maya yucateco: Estudios lingüísticos sobre algunas lenguas indígenas mexicanas*. Mexico City: Universidad Nacional Autónoma de México. 81–130.

Stewart, Cloyd & Ruth D. Stewart (2000). *Diccionario amuzgo de San Pedro Amuzgos, Oaxaca*. Number 44 in Vocabularios indígenas. Coyoacán, DF: Instituto Lingüístico de Verano.

Tapia García, L. Fermín (1999). *Diccionario amuzgo-español: El amuzgo de San Pedro Amuzgos*. Mexico City: Plaza y Valdés.

Tapia García, L. Fermín (n.d.). *Ndöba kondui jñ'o na xé^{n}' nkwí 'na nntz'a tz'a^{n}. Conjugación de verbos en amuzgos: Amuzgo de San Pedro Amuzgos*. Ms, Community of San Pedro Amuzgos, Oaxaca, Mexico.

Trommer, Jochen (2008). A feature-geometric analysis of Amharic verb classes. In Asaf Bachrach & Andrew Nevins (eds.) *Inflectional identity*. Oxford: Oxford University Press. 206–236.

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