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Cross-Anchoring of Tones in Hoiliuk Triplication

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This paper discusses the tone changes in Hoiliuk triplication, in which the prefix (the first syllable) receives a heavy stress and carries a high pitch. What is particularly of interest is that the tones in the base may be copied and undergo metathesis in the prefix, which may either be bimoraic or be lengthened as trimoraic. I posit two floating elements, a floating mora and a floating high tone, in the underlying representation of the prefix and propose a model of triplication correspondence, which considers the prefixal output as a result of the interaction between IO correspondence and OO correspondence, and of the interaction between faithfulness constraints and markedness constraints.

Keywords: tone, triplication, floating element, cross anchor, OT, Hoiliuk dialect

1. Introduction

This paper addresses the tone changes of the triplication in Hoiliuk, the second large Hakka dialect spoken in Taiwan, and takes a perspective from Optimality Theory (Prince and Smolensky 1993/2004, McCarthy and Prince 1995, Itô et al 1996, Inkelas and Zoll 2007, McCarthy 2008a), which considers constraint reranking a device to explain language-external and language-internal variations. A common pattern in Southern Min dialects is that adjectives are triplicated to highlight semantic contents. Due to close contact between Southern Min and Hakka dialects, the emphatic adjective triplications are developed among senior speakers of Hakka as well. Yip (1980) posits a floating high tone in the prefix (the first syllable) of the triplication, which allows the prefix to end in a high pitch. Hoiliuk triplication is expressly of interest in that the tones in the base may be copied and undergo metathesis in the prefix. The remainder of this paper is organized as follows. A description of tones and triplication tone changes of Hoiliuk is offered in §2, followed by a proposal for the underlying representation of the prefix in §3. An Optimality Theory analysis of the triplication is given in ξ4, and the conclusion follows in §5.

2. Tones and Tone Changes

Hoiliuk is the second largest Hakka dialect in Taiwan, chiefly spoken in the Counties of Sinchu and Taoyuan, situated in the Northwest of the Taiwan Island. There are seven base tones in Hoiliuk, including five smooth tones and two checked tones.[1] In particular,

[1] A checked tone is a short tone of a checked syllable, which ends in a voiceless stop, such as

Shang and Yin Ru are subject to tone sandh; the sandhi form of Shang is LL, and that of Yin Ru is M, as shown in (4).
(1) Hoiliuk tones

	Base Tones	Sandhi Tones
Ying Ping	HM	
Shang	LM	LL
Yin Qu	LL	
Yin Ru	H	M
Yang Ping	HH	
Yang Qu	MM	
Yang Ru	M	

Tone sandhi is a common phenomenon in Chinese dialects. In Hoiliuk, in any pair of adjacent Shang tones or Yin Ru tones, the first will surface as a sandhi tone. On the other hand, all the seven tones undergo changes in triplication. This paper is intended to analyze the tone patterns of the first syllable in the triplication. The following are some examples.

(2) Yin Ping triplication

	vu	*vu*	*vu*	
(a)	MH	HM	HM	'very dark'
(b)	MHH			'very very dark'

(3) Shang triplication

	lo	*lo*	*lo*	
(a)	LH	LL	LM	'very old'
(b)	LHH			'very very old'

(4) Yin Qu triplication

	gui	*gui*	*gui*	
(a)	LH	LL	LL	'very expensive'
(b)	LHH			'very very expensive'

(5) Yin Ru triplication

	sip	*sip*	*sip*	
(a)	MH	M	H	'very swet'
(b)	MHH			'very very swet'

(6) Yang Ping triplication

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[p], [t], [k], and [?].

	fung	*fung*	*fung*	
(a)	HH	HH	HH	'very red'
(b)	HHH			'very very red'

(7) Yang Qu triplication

	ngang	*ngang*	*ngang*	
(a)	MH	MM	MM	'very hard'
(b)	MHH			'very very hard'

(8) Yang Ru triplication

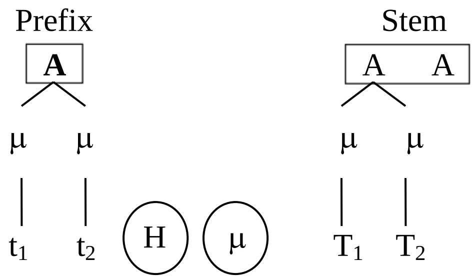
	phak	*phak*	*phak*	
(a)	MH	M	M	'very white'
(b)	MHH			'very very white'

We can summarize three types of tone pattern of the first syllable, as boldfaced. The first type shows mid-high contours, lengthened or not lengthened, as in (2), (5), (7) and (8). The second type is low-high, as in (3) and (4), and the third type is high level, as in (6).

2. Triplication Correspondence

Chiang (1992) proposes that disyllabic reduplication in Chinese dialects is composed of a monosyllabic stem and a reduplicated suffix. On the other hand, Lin (2011) considers that the second syllable of the disyllabic reduplication is the root, which the first syllable is prefixed to. As Lin indicates, the first syllable must undergo tone sandhi, but the second syllable retains its base tone. This is consistent with the universal ranking that FaithRoot dominates FaithAffix. Ou (1996) suggests then that the first syllable of the triplication in Southern Min is prefixed to the disyllabic reduplication. Similar observations are found in Shih (1997) and Hsiao (1999). Like Southern Min, the first syllable in Hoiliuk triplication serves to highlight semantic content, and, as discussed in §2, it has three surface patterns: it may carry a mid-high contour, a low-high contour or a high level, with or without syllable lengthening. Accordingly, I posit here a floating high tone (as proposed by Yip 1980) and a floating mora in the underlying representation of the prefix, as in (9).

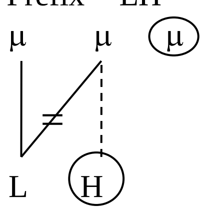
(9) Prefixal reduplication



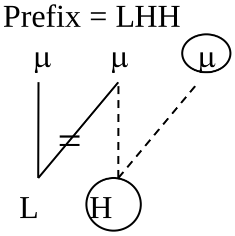
The circled μ indicates the floating mora, and the circled H indicates the floating high tone. T_1 and T_2 are tones in the first syllable of the stem, while t_1 and t_2 are the copied tones. The idea is that the prefix copies the morae and tones from the first syllable of the disyllabic stem, and recruits the floating high and the floating mora. The association between the tones and the morae then yields the two tonal variants of the prefix. In a triplication like ***lo*** *lo lo* 'very (very) old', the prefix, as boldfaced, may surface as LH or LHH. In terms of syllable length, there are three morae available for the prefix, including the head mora, the nonhead mora,[2] and the floating mora. When the floating high tone docks only onto the nonhead mora (the second mora), the floating mora will be stray-erased, and an LH can be derived without being lengthened, as in (10a). When the floating high spreads to the floating mora, the syllable is lengthened and carries an LHH, as in (10b).

(10) Tonal variants of the prefix

a. Prefix = LH



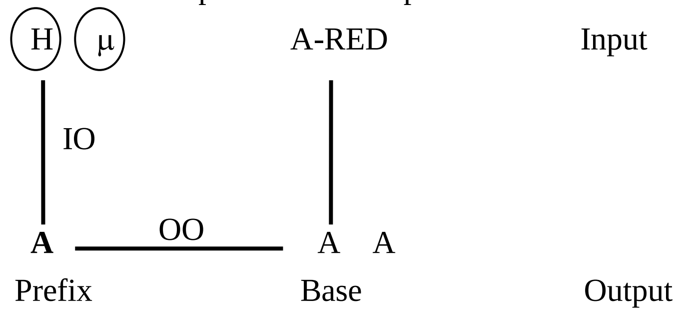
b. Prefix = LHH



The Optimality Theory (Prince and Smolensky 1993/2004), hereafter OT, characterizes the universal grammar as consisting of universal constraints, which are ranked differently among languages. The Correspondence Theory (McCarthy and Prince 1995) extends faithfulness to the identity between the output base and the reduplication. Hoiliuk triplication, AAA, instantiates an interesting case of the output-to-output correspondence. I propose a model of triplication correspondence in (11), which contends that the stressed and lengthened RED_1, **A-**, is prefixed to the disyllabic AA stem.

[2] The first mora is typically the most sonorous mora in a syllable, and is conventionally referred to as the head mora, and the second mora is a nonhead mora (Archangeli and Pulleyblank 1994; Zec 1995, among others).

(11) A Model of Triplication Correspondence



In terms of Correspondence Theory, the first syllable of the disyllabic AA stem serves as the corresponding base. The tones and morae in the corresponding base are preserved in the prefix. The prosodic association is basically achieved by way of interactions between a set of faithfulness constraints and markedness constraints, as will be discussed in ξ4. The association of the floating mora contributes to the syllable lengthening of the prefix, and the association of the floating high tone allows the prefix to carry in a high pitch. From the perspective of OT, three questions are in order. First, what constraints govern the lengthening of the prefix? Second, what constraints govern the tonal mapping in the prefix? Finally, how are the tonal variants accounted for through distinct constraint rankings?

4. An OT Analysis

I have shown in §2 that Hoiliuk has three types of prefix tone pattern. The first type is mid-high, lengthened or not lengthened, as in (2), (5), (7) and (8). The second type is low-high, as in (3) and (4), and the third type is high level, as in (6). The present analysis argues that the input of the prefix contains a floating mora, which may be linked in the output and result in syllable lengthening. I posit four constraints to govern the moraic operations, as in (12-15).

(12) MaxFloatμ-IO

Assign one violation mark for every unlinked mora in the input that is not linked to the prefix in the output.

(13) AlignFloatμ-R

Assign one violation mark for every mora that intervenes between the right edge of the floating mora and the right edge of the prefix.

(14) Maxμ-OO

Assign one violation mark for every mora in the base that does not have a correspondent in the prefix.

(15) $*\sigma_{\mu\mu\mu}$

Assign one violation mark for every additional mora that is linked to a bimoraic syllable.

The interactions between MaxFloatμ-IO and $*\sigma_{\mu\mu\mu}$ determine the lengthening of the prefix. When MaxFμIO dominates $*\sigma_{\mu\mu\mu}$, the prefix is lengthened with the addition of the floating mora. In contrast, when $*\sigma_{\mu\mu\mu}$ dominates MaxFμIO, the floating mora can not surface and the prefix is not lengthened. The MaxFloat constraints have traditionally entailed the correspondence between input floating autosegments and output bearing units (McCarthy and Prince 1995, Myers 1997). Wolf (2007) disagrees with this assumption and indicates that a fully faithful candidate for a MaxFloat constraint should be an input floating autosegment that remains floating in the output. He thus suggests the existence of the markedmess constraint *Float, which bans any unlinked element in the output. In this paper, I have assumed stray-erasure and omit constraints like *Float. The constraint AlignRightFloatμ is undominated and it requires the floating mora to be adjoined to the right side of the prefix, making possible the lengthening of the prefix. On the other hand, Maxμ-OO, also a top-ranked constraint, preserves the morae of the base. The Hasse diagram in (16) illustrates the alternative rankings governing this lengthening discrepancy.

(16) Moraic Constraint rankings of the prefix

a. AlignRightFμ Maxμ-OO $*\sigma_{\mu\mu\mu}$

MaxFloatμ-IO

b. AlignRightFμ Maxμ-OO MaxFμ-IO

$*\sigma_{\mu\mu\mu}$

The moraic constraints are reranked in (16a,b), and the tableaux in (17) and (18) show how the lengthening alternatives are selected.

(17) ***vu*** *vu vu* 'very black'

Prefix input: μ Base: μμ Prefix output: μμ

		$*\sigma_{\mu\mu\mu}$	Maxμ-OO	AR-Fμ	MaxFμIO
☞	a. μμ				*
	b. μμμ	*W			L

(18) ***vu*** *vu vu* 'very black'

Prefix input: μ Base: μμ Prefix output: μμμ

		MaxFμIO	Maxμ-OO	AR-Fμ	$*\sigma_{\mu\mu\mu}$
	a. μμ	*W			L
☞	b. μμμ				*

In terms of tonal operation, this analysis employs the notion of cross-anchoring introduced by Itô et al (1996). In their observations of Japanese argot, Itô et al (1996) propose that the prosodic elements in two related structures, S_1 and S_2, correspond to each other in a crosswise way. Precisely, given that *x* pertains to the beginnings and *y* the endings of S_1, while *x'* pertains to the endings and *y'* the beginnings of S_2, then *x* corresponds to *x'*, and *y* corresponds to *y'*, as illustrated in (19).

(19) Cross-Anchoring

\/ \/
x *y*
y' *x'*
/\ /\

In Hoiliuk triplication, the tone correspondence between the prefix and the base is crosswise. As shown in (2), HM in the base is cross-anchored in the prefix as MH. I posit two constraints, as in (20) and (21), to govern this tonal operation.

(20) CrossAnchor-OO (CroAcOO)

Let t_1t_2 = tone string; $t_1t_2 \in$ base, and $t_1't_2' \in$ prefix; $t_1 \Re\, t_1'$ and $t_2 \Re\, t_2'$
Assign one violation mark for every t_2 that does not have a correspondent t_2' that precedes t_1'.

(21) Linearity-OO (LinOO)

Let t_1t_2 = tone string; $t_1t_2 \in$ base, and $t_1't_2' \in$ prefix; $t_1 \Re\, t_1'$ and $t_2 \Re\, t_2'$
Assign one violation mark for every t_2 that has a correspondent t_2' that precedes t_1'.

The constraint CrossAnchor-OO requires the edge-strings between structures to correspond to each other in a crosswise fashion. On the contrary, Linearity-OO prohibits metathesis. The latter must be dominated by the former, as in (22).

(22) Tonal constraint ranking of the prefix (preliminary)

CrossAnchor-OO
|
Linearity-OO

This ranking ensures that a HM in the base emerges as a MH in the prefix, as shown in (23). The W symbol represent the winner, and the L symbol represents the loser; in McCarthy's (2008a)'s terms, they are restricted to the loser rows, and they indicate how a loser is compared with the winner on each constraint.

(23) ***vu*** *vu vu* 'very black'

Prefix input: H μ Base: HM HM Prefix output: MH

		CroAcOO	LinOO
☞	a. MH		*
	b. HM	*W	L

The fact that the prefix is heavily stressed and terminates in a high pitch indicates the existence of a floating high tone. I posit two constraints to govern the parsing of this floating high, as in (24) and (25).

(24) MaxFloatHigh-IO (MaxFHIO)

Assign one violation mark for every unlinked tone in the input that is not linked to the prefix in the output.

(25) AlignLeftFloatHigh (AL-FH)

Assign one violation mark for every mora that intervenes between the left edge of the floating high tone and the left edge of the head mora.

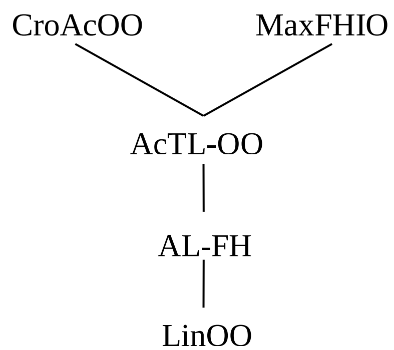
MaxFloatH-IO requires the floating high to surface. It should be top-ranked to ensure that the prefix carries a high pitch. AlignFloatH-L requires the left edges of the floating high and the head mora to coincide; it reflects the idea that higher tone is less marked than lower tone in a prosodically prominent position (de Lacy 1999), such as the head mora of the prefix. This constraint is often dominated, as the leftmost tone of the prefix is usually governed by the anchoring constraints. I posit the constraint in (26) to govern the correspondence between the prefix and the base.

(26) AnchorT-L-OO (AcTL-OO)

Assign one violation mark for every tone in the leftmost mora of the base that does not have a correspondent in the leftmost mora of the prefix.

The constraint AnchorT-L-OO dictates positional faithfulness; the privilege position lies at the left edge. Precisely, this constraint requires tone identity between the head mora in the prefix and that in its corresponding base. Tonal constraint ranking can be enriched as followed.

(27) Tonal constraint ranking of the prefix (enriched)



The tableaux in (28) and (29) show how this ranking selects the first type of prefix tone pattern, bimoraic and trimoraic.

(28) ***vu*** *vu vu* 'very black'

Prefix input: H Base: HL Prefix output: LH (bimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	LinOO
☞	a. LH			*	*	*
	b. LL		*W	*	*	L
	c. HL	*W		L	L	L
	d. HH	*W		L	L	L

(29) ***vu*** *vu vu* 'very very black'

Prefix input: H Base: HL Prefix output: LHH (trimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	LinOO
☞	a. LHH			*	*	*
	b. LLL		*W	*	L	L
	c. LLH			*	**W	*
	d. HHH	*W		L	L	L
	e. HLL	*W		L	L	L
	f. HHL	*W		L	L	L

Candidates (c-d) in (28) and candidates (d-f) in (29), where metathesis does not occur, are favored by AlignLeftFloatHigh but violate CrossAnchor-OO. Candidates (b) are ruled out by MaxFloatHigh-IO, as the floating high tones are deleted. In (28), candidate (a), the bimoraic MH, is selected as the optimal output. In (29), AlignLeftFloatHigh then favors candidate (a) over candidate (c), as the latter incurs two violations of it, and eventually candidate (a), the trimoraic MHH, is the optimal output.

The second type of the prefix tone pattern is low-high, which can be obtained in the same way, as in (30) and (31).

(30) ***gui*** *gui gui* ‘very black’

Prefix input: H Base: HM Prefix output: MH (bimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	LinOO
☞	a. MH			*	*	*
	b. MM		*W	*	*	L
	c. HM	*W		L	L	L
	d. HH	*W		L	L	L

(31) ***gui*** *gui gui* ‘very very black’

Prefix input: H Base: HM Prefix output: MHH (trimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	LinOO
☞	a. MHH			*	*	*
	b. MMM		*W	*	L	L
	c. MMH			*	**W	*
	d. HHH	*W		L	L	L
	e. HMM	*W		L	L	L
	f. HHM	*W		L	L	L

The third type of the prefix tone pattern is high-level, as seen earlier in (6). I propose two markedness constraints in (32) and (33) to govern this pattern.

(32) Share[H]

Assign one violation mark for every pair of adjacent mora that are not linked to the same token of H.

(33) Tone Markedness Hierarchy

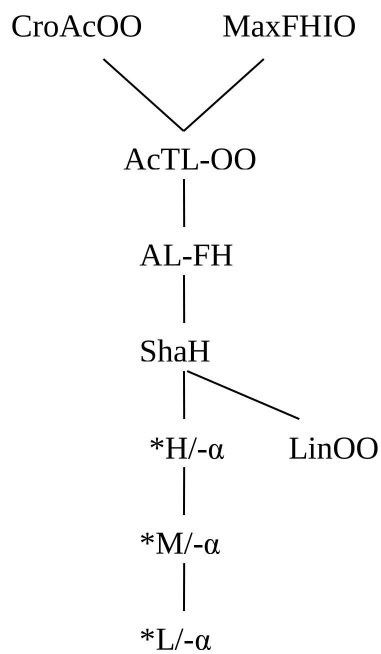
*H/-α >> *M/-α>> *L/-α where α = prosodic head

The constraint Share(H) requires adjacent units to share the same high tone, setting forth a tonal version of McCarthy’s (2008b) Share(F). The Tone Markedness Hierachy in (33) consists of three constraints, *H/-α, *M/-α and *L/-α. The dominance relation *H/-α >> *M/-α>> *L/-α regards low tone as the least marked in a prosodic nonhead position (-α), which in the case of the triplication prefix is a nonhead mora. Similar ideas are developed in de Lacy (1999), Zhang (2001), Yip (2002) and Lin (2007).[3] The ranking of

[3] de Lacy (1999) suggest that high tone is more prominent than low tone, and thus a prosodic head is more likely to be associated with a high tone. Lin (2007) also posits that lower pitch is preferred in a neutral tone position (i.e., a metrically weak position). Zhang (2001) and Yip (2002)

Share(H) over *H/-α ensures that the prefix ends in a high. The tonal constraint ranking can be enriched as in (34).

(34) Tonal Constraint rankings of the prefix (further enriched)



The tableaux in (35) and (36) show how this ranking selects the third type of prefix tone pattern, bimoraic and trimoraic.

(35) ***fung*** *fung fung* ‘very red’
Prefix input: H Base: HH Prefix output: HH (bimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	ShaH	*H/-α	LinOO
☞	a. HH						*	
	b. HL					*W	L	

propose a more general marking relation of tone, i.e., contour is more marked than high level, which is in turns more marked than low level.

(36) ***fung*** *fung fung* 'very very red'

Prefix input: H Base: HH Prefix output: HHH (trimoraic)

		CroAcOO	MaxFHIO	AcTL-OO	AL-FH	ShaH	*H/-α	LinOO
☞	a. HHH						**	
	b. HHL					*W	L	

High tone is not preferred on a nonhead mora, as candidates (a) in (35) and (36) violate *H/-α. However, the effect of Share[H] forces the prefix to terminate in a high pitch, and thus candidates (a) are selected as the optimal outputs.

5. Conclusion

To briefly summarize, this paper has made several arguments. First, based on several previous studies, I have considered that the triplication consists of a prefix and a disyllabic reduplication. Second, I have proposed that there is not only a floating tone but also a floating mora in the triplication. Third, I propose a model of triplication correspondence. The first syllable of the disyllabic AA stem serves the base. The tones and moras in the base are preserved in the prefix. The mapping of tones and moras are governed through interactions between IO correspondence and OO correspondence, and through interactions between correspondence constraints and markedness constraints. Fourth, the prefixal lengthening is determined by the interaction between two moraic constraints, MaxFloatμ-IO and $*\sigma_{\mu\mu\mu}$. Fifth, the top-ranking of CrossAnchorOO allows tonal metathesis to occur in the prefix. Finally, the end pitch of the prefix is determined by the interaction between two tonal constraints, Share[H] and *H/-α.

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