A-7

Another complex phenomenon posing a problem for Parallel Optimality Theory

Hiroki Koga
Saga University

Abstract

Parallel Optimality Theory (OT) in contrast with Harmonic Serialism of OT has been discussed regarding whether it can explain various kinds of phenomena, for example, complex phenomena as well. We will show that Parallel OT cannot explain another complex phenomenon of 1) apocope interacting with 2) compensation for further absence of the final liquid, as schematized as the pair of the underlying forms /...Vru#C/ and the phonetic forms [...V:.C] or [$VC_i.C_i$] with the intermediate forms *...VrC*. For example, Parallel OT cannot reject the constraints and their ranking that Harmonic Serialism would reject because they predict the unnatural interactions of the complex phenomenon, and Parallel OT lets them to predict part of the complex phenomenon falsely, schematized in the pair of the underlying forms /...uru#C/ and the phonetic forms [...uuC], or [u:C].

Keywords: Parallel OT, Harmonic Serialism, apocope and compensation for further absence of final liquid, Takeo Saga dialect of Japanese

1 Apocope and compensation for further absence of the word-final liquid

The complex phenomenon of apocope interacting with compensation for further absence of the final liquid is observed in the non-past forms of the Takeo Saga dialect of Japanese, as schematized in the pair of the underlying forms /...Vru#C.../ and the phonetic form either [...V:.C...] or [...$VC_j.C_j$...] via their intermediate forms *...Vr.C...* (Koga 2015). The pair of the pattern of the underlying form and the phonetic form in conjunction with the intermediate form is exemplified by (1a) - (1f).

(1) a. [haw waʃi]/[ha: w...] ~ /har+u wasi/ - Intermediate form: *har w...*
paste+Non-past Japanese traditional paper
'the Japanese paper that (I) paste (there)'

b. [kik kami]/[ki: k...] ~ /kir+u kami/ - Intermediate form: *kir k...*
cut+Non-past paper
'the paper that (I) cut'

c. [kik kimono]/[ki: k...] ~ /ki+ru kimono/ - Intermediate form: *kir k...*
wear+Non-past clothes
'the clothes that (I) wear'

d. [hedz dziNko:]/[he: dz...] ~ /her+u zinkou/ - Intermediate form: *her dz...*
decrease+Non-past population
'the population that will decrease'

e. [hɯm mizoɾe]/[hɯ: m...] ~ /hur+u mizore/ - Intermediate form: *hur m...*
fall+Non-past icy snow
'the icy snow that falls'

f. [hod do:ɾo]/[ho: d...] ~ /hor+u douro/ - Intermediate form: *hor d...*
dig+Non-past road
'the road that (we) dig'

To postulate the liquid /r/ at the finals of the stems of these verb stems, (1)a, (1)b, (1)d, (1)e, (1)f, is motivated by their negative or causative forms, for example, [hɯɾaN] and [hɯɾasɯʔ] for /hur/ 'fall'.

Wilson's (2001) motivation to treat phenomena as complex is observed in the dialect. The underlying forms which would be the intermediate forms in Harmonic Serialism /...Vr.C.../ are associated with the phonetic forms with

compensation for absence of the morpheme-final liquid [...$VC_j.C_j$...], as exemplified by the pairs of the underlying form and the phonetic form (2a) (for the verb in 1a), (2b) (for the verb in (1b)), (2c) (for the verb in (1d)), (2d) (for the verb in (1e)), and (2e) (for the verb in (1f)).

(2) a. [hatta] /har+ta/
apply+Past
b. [kitta] /kir+ta/
cut+Past
c. [hetta] /her+ta/
decrease+Past
d. [hɯtta] /hur+ta/
fall+Past
e. [hotta] /hor+ta/
dig+Past

In addition, apocope similar to that of the Takeo Saga dialect of Japanese occurs in many languages. For example, short unstressed vowels are present or absent synchronically in the environment of V(owel)[*sono(rant)*] __# in Isthmus Nahuatl, spoken in Veracruz, Mexico (Kenstowicz and Kisseberth 1979: 298).

(3) a. kikówa ~ kików 'he buys it'
b. kítaja ~ kítaj 'he already sees it'
c. sǐkakíli ~ sǐkakíl 'put it in it'
d. támi ~ tám 'it ends'

The language avoids light syllables at the end of verb forms if the final consonant is a sonorant, for example, /w/, /j/, /l/, /m/, and invites one heavy syllable with the underlying final vowel absent and with the underlying final consonant added to the previous syllable as the coda.

2 Problem for Parallel OT

McCarthy (2011) argues that Parallel OT cannot explain syncope interacting with consonant cluster simplification. I will show that Parallel OT, even if adopting Sprouse's (1997) Enriched Inputs, cannot explain apocope interacting with compensation for the further absence of the word-final liquid, either, specifically works clumsily, whichever are employed between the constraints and rankings that Harmonic Serialism would employ and those that Harmonic Serialism would reject, as will be shown in sections 2.2 and 2.3.

2.1 HS-OT analysis

An analysis in the framework of Harmonic Serialism of OT to explain the complex phenomenon of the Takeo Saga dialect is in order: Koga's (2015) proposed constraints and rankings (4).

(4) a. [1] Contiguity ≫ {[2] OCP: *S(emi)H(omorganic) [sono][high]$_{\text{non-past}}$, [3] CodaCond} ≫ {[4] Max[Place], [5] HavePlace} ≫ {[7] NoLink[Place], [8] Ident[Cons]} ≫ [9] Max[Manner]
b. [6] Ident$_{\text{affix}}$[Long] ≫ {[7] NoLink[Place], [8] Ident[Cons]}

The rankings are represented in the Hasse Diagram in Figure 1.

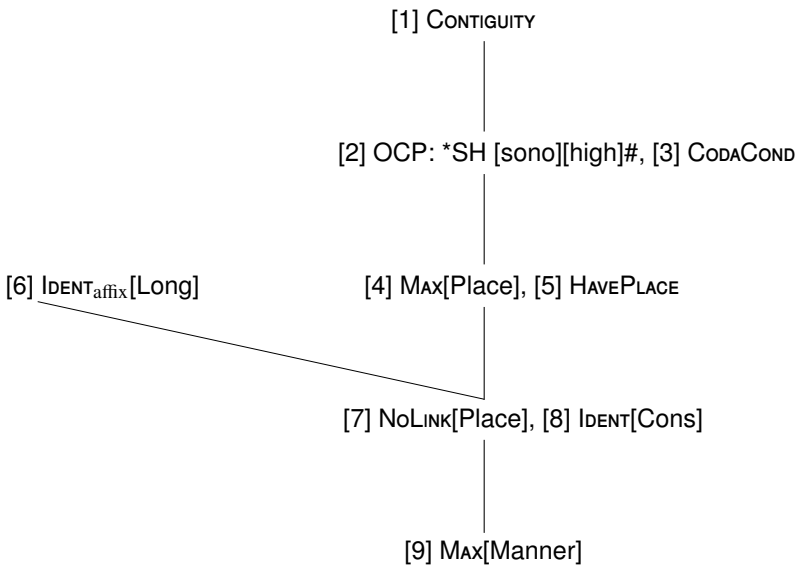
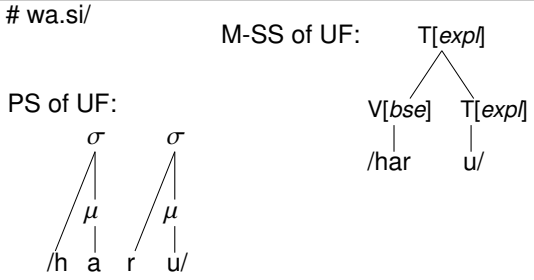
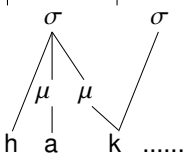
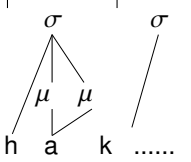


Figure 1: Hasse Diagram for Minority

Obligatory Contour Principle (OCP): *S(emi)H(omorganic) [sono][high]$_{\text{non-past}}$# states that no semi-homorganic sequence of a sonorant and a high vowel is allowed at the final of the non-past forms. The constraint is an extension of OCP: H(omorganic) [sono][high] suggested by Staroverov (2014: 76), which prohibits the sequences /wu/ and /ji/ of Japanese, for example. Koga's (2015) HS-OT analysis correctly predicts that the underlying form /har+u/#/watextipaSi/ 'the Japanese paper which (I) paste' is associated with either [ha$_{\text{ru}}$ (w...)] or [haw$_{\text{j}}$(w$_{\text{j}}$...)] or [ha: (w...)], as computed in Tableau 5.

(5) Harmonic improvements of /har+u/ 'paste+Non-past' for 'soft sound lovers'

		Contiguity	OCP: *SH [sono][high]$_{\text{non-past}}$#	CodaCond	Max[Place]	HavePlace	NoLink[Place]	Ident[Cons]	Max[Manner]	Ident$_{affix}$[Long]	NoLink[Place]	Ident[Cons]
	Step 1: /ha.ru # wa.si/ 											
☞	a. har # w...			*								
☞	b. ha.ru # w...		*									
	c. hau # w...	*			*			*	*			
	Step 2: *har # wa.si*											
☞	a. haH # w...				*	*						
	b. har # w...			*								
	Step 3: *haH # wa.si*											
☞	a. haw$_i$ # w$_i$... 						*		*		*	
☞	b. ha: # w... 							*	*			*
	c. haH # w...					*						

If the constraint Contiguity were ranked lower than the constraints OCP: *SH and CodaCond, then the candidate *[hau] would be predicted to be associated with /haru/. This would treat the interaction of the complex phenomenon as absence of the onset liquid interacting with the replacement of the second vowel with the second part of the lengthened vowel, as schematized as /haru/ - *hau* - *[ha:].[1] This is an incorrect prediction. What kind of other predictions such a set of constraints and rankings with Contiguity ranked lower makes when the stem-final vowel is not /a/, as is in (5), but /u/, /o/, /i/ or /e/, will be discussed in section 2.3.

2.2 If HS-adopted constraints and rankings are employed in Parallel OT

This section will show that HS-adopted constraints and rankings do not work well in predicting the complex phenomenon of the Takeo Saga dialect of Japanese in Parallel OT. Suppose the same constraints and ranking as those of Koga (2015) are employed in Parallel OT. The relevant constraints and rankings are [1] Contiguity ≫ {[2] OCP: *SH [sono][high]$_{\text{non-past}}$, [3] CodaCond} ≫ [4] Max[Place] ≫ {[7] NoLink[Place], [8] Ident[Cons]}. It will be either of the two

[1] The sequence /au/ can never realize itself as [a:] in Japanese, which violates Ident[Quality]$_{\text{stem}}$.

cases depending on interpretation of what must be faithful by faithfulness constraints. One is that they make an incorrect prediction, not being able to postulate intermediate forms, and the other is that they make no clear prediction. Parallel OT would force a segment of *either* the underlying form *or* the phonetic form to be faithful to its phonetic or underlying counterpart. First, if faithfulness constraints force a segment of the underlying form (...VC_1u#C_2V...) to be faithful, Parallel OT will incorrectly predict that the three candidates– the candidate phonetic forms with apocope and the first consonant absent (VC_2V), 2) those with apocope and the second consonant absent (VC_1V) and 3) those with apocope and the first consonant replaced with the second half of the lengthened vowel (V:C_2V)–are predicted to be equally optimal, as exemplified by /haru wasi/ 'the Japanese paper which (I) paste' in Tableau 1.

Tableau 1: In the framework of Parallel OT

	/haru wasi/	[1]	[2]	[3]	[4]	[7]	[8]
☞	a. [haw$_j$.w$_j$...]				*	*	
☞	b. *[har$_j$.r$_j$...]				*	*	
☞	c. [ha:.w...]				*		*
	d. *[ha.ru w...]		*				
	e. *[har.w...]			*			
	f. *[ha.u.w...]	*			*		

The three candidate forms 1) [haw$_j$.w$_j$aʃi], 2) *[har$_j$.r$_j$aʃi] and 3) [ha:.waʃi] are predicted to be equally optimal. The candidate *[har$_j$.r$_j$...] violates no higher-ranked constraint than the candidates [haw$_j$.w$_j$...] and [ha:.w...]. Each of the final consonant /r/ of the non-past form and the initial consonant /w/ of next word is at the onset of the syllable of the underlying form, and is perceptually salient. See McCarthy (2011) for this discussion when the second of the consonant cluster is in a word as in [anta] and *[ampa] for /amita/. The three only violate MAX[Place] and either NOLINK[Place] or IDENT[Cons]. The candidate *[har$_j$r$_j$...] is optimal as the other two are. This is an incorrect prediction. (In Harmonic Serialism, CODACOND ≫ {MAX[Place], HAVEPLACE} would not allow the intermediate form *harw...* to be associated with *harH...*, which would be further associated with *[har$_j$r$_j$...], but would allow it to be associated with *haHw...* (McCarthy 2008). Here *H* is the Placeless counterpart of the liquid. The intermediate form *harH...* violates CODACOND, whereas *haHw...* does not.) Next, if faithfulness constraints force a segment of the phonetic form to be faithful, Parallel OT will make no clear prediction. No consonant to protect and check is in the phonetic forms [haw$_j$.w$_j$...], [ha:.w...], and *[har$_j$.r$_j$...] for the underlying form /haru w.../.

2.3 If HS framework-rejected constraints and rankings were employed in Parallel OT

Suppose such constraints and rankings as {[2] OCP: *SH [sono][high]$_{\text{non-past}}$, [3] CODACOND} ≫ {[7] NOLINK[Place], [8] IDENT[Cons]} ≫ [1] CONTIGUITY are employed in Parallel OT. As Harmonic Serialism rejects the constraints and rankings because they are proposed for the unnatural interaction of *...Vu C...* and /...Vru C.../, it would be desirable if the framework of Parallel OT can reject the constraints and rankings. Actually, the framework of Parallel OT cannot do so, having no concept of intermediate forms. The constraints and rankings will be examined regarding what kind of predictions they make in Parallel OT.

Tableaux 2: If /...V$_i$ru#C.../, V$_i$ = /i/

	/iru m.../	[7]	[8]	[1]
☞	*[iu m...]			*
	[im$_j$m$_j$...]	*		
	*[i$_j$r$_j$...]	*		
	[i: m...]		*	

The constraints and rankings ({[2], [3]} ≫ {[7], [8]} ≫ [1]) in Parallel OT will make an incorrect prediction if the vowel /i/ or /e/ precedes the final sequence /ru/ as well, as the prediction in the case of the vowel /i/ computed in Tableau 2. This is expected as the constraints and rankings with CONTIGUITY ranked lower than OCP: *SH and CODACOND were shown to be predicted to make an incorrect prediction when the non-past form has the vowel /a/ preceding the final sequence /ru/ at the end of the section 2.1. The phonetic form *[iu] has the least serious violations, violating CONTIGUITY only, for the underlying form /iru/, and is predicted to be optimal. This is an incorrect prediction because the phonetic form is [im$_j$m$_j$...] or [i:m...]. By contrast, when the vowel preceding the final sequence /ru/ of the non-past form is /u/ or /o/, as schematized as /...V$_i$rV$_j$#C..../, where V$_j$ is a high back vowel and V$_i$ is a high or mid back vowel, the constraints and rankings in Parallel OT will unexpectedly make a correct, though insufficient, prediction. For example, the phonetic form [huu] has the least serious violations, violating CONTIGUITY only, and is optimal, as in Tableau 3. Both phonetic forms [huC$_j$C$_j$...] violate NOLINK[Place]. The phonetic form [hu:] violates IDENT[Cons]. Native speakers do not distinguish the hiatus of an identical vowel and the lengthened vowel like [huu] and [hu:].[2] Notably, the phenomenon is not a complex one in the treatment. It is a correct prediction although the analysis cannot make correct predictions of [hum$_j$m$_j$...] and [hu:] as optimal.

[2] The underlying vowel sequence /ou/ phonetically realizes itself as [o:] in Japanese. Constraints for association between /V$_i$V$_i$/ and [V$_i$:] and between V$_i$[back α][mid]V$_j$[back α][high] and V$_i$[back α][mid]V$_j$[back α][mid] are relevant. To have these ranked high does not change the validity of the discussion in the text.

Seeing the examinations of the two parts of the complex phenomenon, the HS framework-rejected constraints and rankings ({[2], [3]} ≫ {[7], [8]} ≫ [1]) are eventually falsified because they cannot correctly predict the complex phenomenon as a whole. They are rejected not by the unnatural interaction, but by the predictability of the complex phenomenon by the constraints and rankings in Parallel OT.

Tableaux 3: If /...V_jrV_j#C.../, V_j = /u/

	(1a) /huru m.../	[7]	[8]	[1]
☞	[huu m...]			*
	[hum$_j$m$_j$...]	*		
	*[hur$_j$r$_j$...]	*		
	[hu: m...]		*	

2.4 Theoretical implications of predictions of HS framework-rejected constraints and rankings and HS-adopted constraints and rankings

Table 4: HS-OT vs. P-OT in predicting the complex phenomenon

	Phenomenon I	Phenomenon II
Underlying forms Phonetic forms	/...{u, o}ru(#C...)/ [...{u,o}C$_j$(C$_j$...)] or [..{u,o}ː(C...)]	/...{i, e, a}ru(#C...)/ [...{i, e, a}C$_j$(C$_j$...)] or [...{i, e, a}ː(C...)]
HS-OT	Constraints and rankings: (4) Intermediate forms: ...*V*r(*C*...) Natural, correct predictions	
HS-OT	Constraints and rankings: {[2], [3]} ≫ [1] Intermediate forms: ...*V*u(*C*...) Unnatural, no prediction	
P-OT	Constraints and rankings: (4) Incorrect prediction or no clear prediction	
P-OT	Constraints and rankings: {[2], [3]} ≫ {[7], [8]} ≫ [1] Correct | Incorrect eventually falsified as a whole	

Summarizing the examinations of 1) constraints and rankings in Harmonic Serialism of OT, 2) the HS-adopted constraints and rankings and 3) the HS-framework rejected constraints and rankings with CONTIGUITY ranked low in Parallel OT in the sections 2.1, 2.2 and 2.3, I will consider what they imply for Parallel OT in contrast with Harmonic Serialism.

If a phenomenon for the underlying forms and the intermediate forms as the phonetic forms occur at least in other languages, and another phenomenon for the intermediate forms as the underlying forms and the phonetic forms occur in the language in question, then it motivates an analysis of Harmonic Serialism of OT that postulates the intermediate forms to explain the complex phenomenon. Koga's (2015) constraints and rankings are an analysis of Harmonic Serialism of OT to explain the complex phenomenon, as shown in the section 2.1 and summarized in the first content line of Table 4. The framework of Harmonic Serialism of OT excludes the constraints and rankings to predict the unnatural interactions of complex phenomena, not letting those examined in the framework, as discussed at the end of the section 2.1 and summarized in the second content line of the table. By contrast, the framework of Parallel OT cannot exclude the constraints and rankings which Harmonic Serialism excludes as predicting the unnatural interactions, allowing no concept of intermediate forms, and lets those be tested by observing what they predicts. Interestingly, the HS framework-rejected constraints and rankings make a correct prediction of part of the complex phenomenon, and yet make an incorrect prediction of the rest. This implies that Parallel OT may allow HS framework- rejected constraints and rankings to make correct predictions of unnatural phenomena falsely. Harmonic Serialism of OT is therefore superior to Parallel-OT in explaining another complex phenomena in that the former restricts more theoretically possible sets of constraints and rankings than the latter, and that the latter may allow constraints and rankings to predict unnatural phenomena.

3 Summary and implication

The paper repeated the data among the native speakers who allow lengthened vowels as well as geminate consonants at the final of the non-past forms of the Takeo Saga dialect of Japanese in Koga (2015), and articulates data in another language and the Takeo Saga dialect to motivate the phenomenon as complex in the section 1. Koga's (2015) analysis in Harmonic Serialism of OT was repeated that explains the complex phenomenon in the section 2.1. The HS-adopted constraints and rankings were shown not to make an incorrect prediction or no clear prediction in Parallel OT in the section 2.2 because Parallel OT allows no concept of intermediate forms. By contrast, the HS framework-rejected constraints and rankings were, surprisingly, shown to make a correct prediction of part of the complex phenomenon falsely in Parallel OT (although they were expectedly shown not to make a correct prediction of the rest of the complex phenomenon) in the section 2.3. The section 2.4 saw the theoretical implication of the

discussions in the sections 2.1, 2.2 and 2.3. Harmonic Serialism of OT is superior to Parallel-OT in explaining complex phenomena. Harmonic Serialism, but NOT Parallel OT, successfully excludes constraints and rankings to treat unnatural interactions, and Parallel OT may allow constraints and rankings to predict unnatural phenomena falsely. The complex phenomenon of apocope interacting with compensation for further final liquid absence thus poses a problem for Parallel OT.

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