K in Conflation Theory: When a Language Has Transguttural Harmony

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ABSTRACT. This paper tries to capture variations of vowel harmony in Conflation Theory (de Lacy (2002, 2004, 2006)). Yamane-Tanaka (2006) assumes Gitksan harmony has variations across speakers: translaryngeal and transguttural. These two types cannot be captured in Conflation Theory unless the composite set of Place features in a markedness category is properly revised. The proposal here is to divide the markedness constraint prohibiting dorsal (= *K) into two distinct constraints (= *K and *Q). This solution captures laryngeal transparency and guttural transparency only with the reranking of conflated constraints, without stipulating a language-specific markedness reversal. This approach limits variations among sets of the so-called *transparent* consonants.

Keywords: place markedness, guttural, vowel harmony, conflation theory, uvular

1. Introduction

This paper is to explore a way to capture variations of cross-consonantal vowel harmony (hereafter VH) in the framework of Conflation Theory (hereafter CT) (de Lacy (2002, 2004, 2006)). In languages where transguttural harmony is attested, uvular or pharyngeal behaves like glottal while velar does not. CT assumes velar, uvular and pharyngeal are in one category of dorsal, although this way of categorization does not seem to be a necessary assumption in CT. But if transguttural harmony has to be analyzed under this categorization, a problem will arise: despite the unmarked status of uvular and pharyngeal relative to velar, the distinction between velar and the guttural set would not be possible.

One of the test cases is Gitksan, a Tsimshianic language spoken in the Skeena River valley on the Northwest coast of British Columbia. What is interesting about this language is that both translaryngeal (Rigsby (1986), henceforth R86) and transguttural (Yamane-Tanaka (2006)) harmonies are attested as speakers' variation. The main proposal is to revise the composite set of constraint in CT, so that the markedness between velar vs. uvular/pharyngeal would be appropriately distinguished.

Section 2 presents basic data of Gitksan. Section 3 outlines de Lacy's version of place markedness hierarchy in the framework of CT. Section 4 explains why *dorsal (= *K) would be a problem, and Section 5 proposes how the revision of *dorsal should be made. In Section 6, I will show that the proposal appropriately captures the typology of cross-consonantal harmony. Section 7 states advantages of the proposal and notes some remaining problems.

2. Gitksan Data

VH is subject to various restrictions such as transparency, domain, directionality, and the phonological/morphological/syntactic conditions, and these limitations vary case by case (see Archangeli and Pulleyblank (in press) for those examples). The entire picture of Gitksan VH is not clear yet, but the domain of the left-to-right translaryngeal VH unarguably includes NP (=Noun Phrase) as in /pé:χ-'y/ [bɛ́hɛ̲'y] 'my lungs' (R86: 223). (Apostrophe in phonemic/phonetic transcriptions indicates [+glottalic] or weak ejective, which is contrastive with a plain version of sonorants as well as stops in Gitksan.) Here the trigger is a stressed vowel in the stem-final syllable, and the target is a schwa which may be 'epenthesized' (R86 (p.217), Hunt (1990)) between a stem-final consonant and the first singular possessive pronominal suffix /–'y/. According to R86, this translaryngeal harmony is observed across all speakers. He also observes that some speakers harmonize [ɔ] across uvular (e.g., /ʔən-tsúq-'y/ [ʔandʒɔ́ɢɘ̲'y] 'my camp'), but speakers without this harmony realize the target as [a] whatever the preceding vowel is (thus [ʔandʒɔ́ɢa̲'y] (R86: 222)).

Examples below are of NPs ending with /–'y/, which I have collected from two Eastern Gitksan speakers born in 1930s. It is found that VH here is more extensive than what R86 described. The target vowels are shown with square brackets ([ ]).

(1) Guttural

a.	ʔ	/ts'áʔ-'y/	ts'áʔ[a]'y	'my eyes (face)'
		/siséʔ-'y/	sɪsɛ́ʔ[ɛ]'y	'my feet'
		/hak'jóʔ-'y/	hak'jóʔ[ɔ]'y	'my back'
b.	χ	/náχ-'y/	náχ[a]'y	'my snowshoes'
		/pé:χ-'y/	bé:χ[ɛ]'y ~ bé:χ[a]'y	'my lungs'
		/núχ-'y/	nɔ́χ[ɔ]'y ~ nɔ́oi	'my mother, mother's sister'
	q'	/ts'áq'-'y/	ts'áq'[a]'y	'my clam'
		/ts'ɔ́q'-'y/	ts'ɔ́q'[ɔ]'y ~ ts'ɔ́q'[a]'y	'my salmon belly'
	q	/ʔá:q-'y/	ʔá:ɢ[a]'y	'my mouth (outer opening), lips'
		/né:q-'y/	né:ɢ[ɛ]'y ~ né:ɢ[a, ə]'y	'my hoof'
		/ʔayɔ́:q-'y/	ʔayɔ́:ɢ'[ɔ]'y ~ ʔayɔ́:ɢ'[a]'y	'my law, to order, command'

(2) Elsewhere

p	/stú:p-'y/	sdú:b[i]'y	'my stove'
t	/qo:t/	ɢɔ́:d[i]'y	'my heart'
t'	/q'a:t'/	q'á:t'[i]'y	'my cane'
x	/lú:x/	lú:x[i]'y	'my alder tree'
	/aná:x/	aná:x[i]'y ~ aná:ji:	'my bread
k	/wák-'y/	wág[i]'y	'my (man's) brother'
	/χská:k-'y/	χsgá:g[i]'y	'my eagle'
k'	/ts'ák'-'y/	ts'ák'[i]'y	'my dish'
	/tl'ó:k'-'y/	tl'ɔ́:k'[i]'y ~ tl'ɔ́:ʔi:	'my mud'
x^w	/mux^w-'y/	mux^w[i]'y ~ múhui ~ múwi	'my ear'
	/ts'ilá:sx^w-'y/	ts'ilá:sx^w[i]'y ~ ts'ilá:shui	'my canyon'
k^w	/qá:k^w-'y/	ɢá:g^w[i]'y ~ ɢá:gui	'my sinew'
k'^{w}	/tî:k'^{w}-'y/	dí:g^w[i]'y ~ dí:gui	'my woman's sister'

Data (1) indicates that a targeted vowel is harmonized with the preceding stressed vowel both across glottal and uvular. Whether the intervening consonant is glottal (1a) or uvular (1b), the triggers include the same set of vowels [ɔ], [ɛ] and [a], which may arise from a guttural laxing rule. Across glottal, the targets stably and totally assimilate to these triggers, while across uvular, the targets vacillate between the total assimilation and the partial assimilation when the triggers are mid vowels. This minor difference aside, uvulars and glottals both show a *transparency* effect, in the sense that they do not block harmony (see Gafos and Lombardi (1999) for the concept). This effect makes a sharp contrast with *opacity* of the other PoAs (= Places of Articulation) as shown in (2), where harmony is blocked and the vowel in question is consistently realized as [i] by default.

Both Rigsby's observations and mine taken into consideration, at least two kinds of harmony systems should be admitted – some speakers have translaryngeal and others have transguttural. What should be stressed in relation to PoA division, velar series behave like coronals and labials, rather than uvular. (For some exceptions, see Yamane-Tanaka (2006).)

3. Place Markedness in Conflation Theory

As basic tenets of classic OT, Prince and Smolensky (1993) state (i) all constraints are universal, (ii) rankings of constraints are language-specific, and (iii) rankings of some markedness constraints are universally fixed. De Lacy (2002, 2004, 2006) point out that the *fixed ranking theory* (= iii) fails to account for the full range of attested hierarchy-referring processes. As a solution to the problem, de Lacy proposes CT, where two or more constraints can be conflated in a principled way so that the distinction of markedness can be ignored (see de Lacy (2002, 2004, 2006) for examples supporting the theory).

De Lacy assumes the PoA markedness hierarchy in (3), which consists of four distinct PoA categories with their contents shown in (4). (Note in de Lacy (2006: 35), "'Dorsal' refers to velars and uvulars (e.g. [k q ŋ N].")

(3) PoA markedness hierarchy (de Lacy (2002, 2004))

*K » *P » *T » *ʔ ('… » …' should be read as '… is ranked above …'.)

(4) PoA categories and their contents (de Lacy (2002: xix))

K: (dorsal)	**P: (labial)**	**T: (coronal)**	**ʔ: (glottal)**
velar	bilabial	dental	[ʔ]
uvular	labio-dental	alveolar	[ɦ]
pharyngeal		postalveolar	[ɦ̠]
		retroflex	[N]
		(palatal)	

De Lacy assumes that (i) hierarchies such as (3) exist (thus no markedness reversal is allowed), and are accessible to constraint generation mechanisms, and that (ii) all languages have the same hierarchy-referring constraints.

Based on the hierarchy in (3), CT allows the following conflations.

(5) Allowable conflations: contiguous

The distinction between *K and *P can be ignored, and the distinction among *K, *P, and *T can also be ignored, etc. But the conflation should be contiguous, so non-contiguous conflations such as *K and *ʔ are inappropriate.

The definitions of each conflated constraint are given below.

(6) Conflated constraints (de Lacy (2002:167))

a. *{K, P}: For every segment that is either dorsal or labial, assign a violation.
b. *{K, P, T}: For every segment that is either dorsal, labial, or coronal, assign a violation.
c. *{K, P, T, ʔ}: For every segment that is either dorsal, labial, coronal, or glottal, assign a violation.

These three conflations are universally available. The rankings among them are freely reranked rather than universally fixed.

4. Problem: Definition of *K

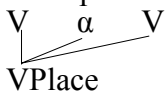
This section shows that de Lacy's constraints (4) would make a wrong prediction about typology of VH.

Harmony has been explored by many different approaches (see Pulleyblank (2002, 2003, 2006a, b) for references). In this paper VH is captured by the conflict between the constraint which prohibits harmony and the constraint which drives harmony. Constraint to ban harmony is expressed with "conjunction" of constraints (Smolensky (1993)), as in (7), which Gafos and Lombardi (1999) propose.

(7) *{α} & V-LINK: Do not share vowel place with α. (Gafos and Lombardi (1999))

Hereafter, constraint (7) is abbreviated as *α & V. This constraint would prohibit the output with cross-consonantal VH as represented below.

(8) *α & V prohibits harmony



Given that *{α} of the notation (7) is filled by a set of conflated constraints (6), the conjoined constraints will result as below.

(9) Proposed conjoined constraints

a. *{K, P}& V: Do not share vowel place with either dorsal or labial.
b. *{K, P, T}& V: Do not share vowel place with either dorsal, labial, or coronal.
c. *{K, P, T, ʔ}& V: Do not share vowel place with either dorsal, labial, coronal, or glottal.

These disfavor harmony, and interact with the following constraint to derive harmony.

(10) HARMONY (Pulleyblank (2002))

No disagreement of features is allowed between the V-V sequence.

This is articulatorily motivated, and prohibits resetting the articulator in a V-to-V sequence.

The tableau below shows how these constraints would conflict. (Due to the limitation of the space, only V-place node is shown in the candidates' representation.)

(11) Violation of constraints

	V α V | V^{PL}	HARMONY	*{α}& V
a.	V α V | | V^{PL} V^{PL}	*!	
b. ☞	V α V |/ V^{PL}		*

Candidate (a) incurs the violation of Harmony, because each vowel has independent V-place. Candidate (b) incurs the violation of *{α} & V, because α bears V-place feature which is shared by the preceding vowel. Following Gafos and Lombardi (1999), we regard the intervening consonant which blocks harmony (as in (11a)) as *opaque*, and the intervening consonant which does not block harmony (as in (11b)) as *transparent*.

Below are all the types of sets of transparent consonants that the theory predicts to be attested.

(12) Crucial rankings and the predicted transparency

a.	HARMONY	»	*{K, P, T, ʔ} & V	All
b.	*{K, P} & V	»	HARMONY	coronal, glottal
c.	*{K, P, T} & V	»	HARMONY	glottal
d.	*{K, P, T, ʔ} & V	»	HARMONY	None

The ranking (a) makes all consonants transparent, producing harmony across all PoAs. The ranking (b) makes K and P opaque, producing harmony across coronal and glottal. The ranking (c) makes K, P, and T opaque, allowing only translaryngeal harmony. The ranking (d) makes all PoAs opaque, producing no cross-consonantal harmony. (Non-crucial constraints are omitted from each ranking. In the ranking (b) for instance, *{K, P, T} & V and *{K, P, T, ʔ} & V should be ranked below HARMONY.)

Here the problem would arise: the system (12) would typologically predict that there are only four types of cross-consonantal VH – there should be no language where uvular and glottal are exclusively transparent. However, such a system exists not only in Gitksan (1) but also other languages such as Ge'ez, Iraqw and Tiberian Hebrew (see (22C) for examples). As long as such a guttural transparency exists, it needs to be captured in some way.

Even if *{K} & V » HARMONY is added to (6), the situation would not be improved: it would make velar, uvular and pharyngeal all opaque, and allow harmony across labial, coronal and glottal. Unless velar vs. uvular/pharyngeal are classified into distinct categories, the guttural transparency cannot be attained.

5. Solution: Division of *K

The source of the problem seems to be in de Lacy's definition of *K: *For every segment that is either velar, uvular, or pharyngeal, assign a violation* (underline mine).

This section proposes *K should be split as in (13), with revision of categories and their contents as in (14). Based on this, CT would generate conflations as in (15).

(13) Proposal:

a. Split of *K into *K and *Q

***K**: For every velar segment, assign a violation.

***Q**: For every uvular (or pharyngeal) segment, assign a violation.

b. ***K** » *P » *T » ***Q** » *ʔ

(14) PoA categories and their contents revised from (4)

K: (dorsal)	**P: (labial)**	**T: (coronal)**	**Q: (uvular)**	**ʔ: (glottal)**
velar	bilabial	dental	uvular	[ʔ]
	labio-dental	alveolar	pharyngeal	[h]
		postalveolar		[ɦ]
		retroflex		[N]
		(palatal)		

(15) Allowable conflation

Again, *{α} & V (= (7)) will be filled by conflated constraints (15). The interaction between these constraints and HARMONY would lead to five types of transparency as in (16).

(16) Crucial rankings and transparent C

a. HARMONY	»	*{K, P, T, Q, ʔ} & V	All
b. *{K, P} & V	»	HARMONY	glottal, uvular/pharyngeal, coronal
c. ***{K, P, T} & V**	»	**HARMONY**	**glottal, uvular /pharyngeal**
d. *{K, P, T, Q } & V	»	HARMONY	glottal
e. *{K, P, T, Q, ʔ} & V	»	HARMONY	None

Notice that both *guttural* transparency (16c) and *glottal* transparency (16d) are successfully captured. When constraints are crucially ranked as in (16c), uvular or pharyngeal should behave like glottal, while velar should be opaque like labial and coronal.

Recall now the two systems attested in Gitksan. The tableaux (17, 18) demonstrate that each system would arise from the ranking difference: guttural transparency arises from the ranking (16c) (= (17)), while glottal transparency arises from the ranking (16d) (= (18)). (Candidate forms are hypothetical.)

(17) Transguttural harmony: Transparency = ʔ, Q

			*{K, P, T } & V	HARMONY	*{K, P, T, Q} & V	*{K, P, T, Q, ʔ}& V
K		eke	*!		*	*
	☞	eki		*		
P		epe	*!		*	*
	☞	epi		*		
T		ete	*!		*	*
	☞	eti		*		
Q	☞	eqe			*	*
		eqi		*		
ʔ	☞	eʔe				*
		eʔi		*		

(18) Translaryngeal harmony: Transparency = ʔ

			*{K, P, T, Q} & V	HARMONY	*{K, P, T, Q, ʔ} & V
K		eke	*!		*
	☞	eki		*	
P		epe	*!		*
	☞	epi		*	
T		ete	*!		*
	☞	eti		*	
Q		eqe	*!		*
	☞	eqi		*	
ʔ	☞	eʔe			*
		eʔi		*	

This is a desired result, for the proposed analysis captures both systems of laryngeal transparency and guttural transparency in terms of the ranking difference of markedness constraints. This picture would not be possible in CT without the introduction of *Q.

6. Typological Implication

This section shows that the rankings attained through the revised markedness hierarchy make an important prediction about typology of harmony.

Types A-E in (19) are all crucial rankings attained from the proposal.

(19) Predicted 5 types

Type A	HARMONY	»	*{K, P, T, Q, ʔ}
Type B	*{K, P} & V	»	HARMONY
Type C	*{K, P, T} & V	»	HARMONY
Type D	*{K, P, T, Q } & V	»	HARMONY
Type E	*{K, P, T, Q, ʔ} & V	»	HARMONY

Each ranking type will produce the following set of transparent consonants in (20).

(20) Prediction of possible set of transparent consonants

Type / consonants	A	B	C	D	E
K, P	✓				
T	✓	✓			
Q	✓	✓	✓		
ʔ	✓	✓	✓	✓	

Notice in (20) that possible transparent consonants are in implicational relationships: Harmony across a marked PoA should always imply harmony across a less marked PoA, but not vice versa. Each type forms subset structures of transparent consonants as below.

(21) Subset structures of transparent consonants

a. A: If K or P is transparent in a language, then T, Q, or ʔ is also transparent.

b. B: If T is transparent in a language, then Q or ʔ is also transparent.

c. **C: If Q is transparent in a language, then ʔ is also transparent.**

d. D: If there is only one place is transparent in a language, it is ʔ.

e. E: There is a language where every place is opaque.

List below are some languages which fall into types A-E, and some representative examples. (Targeted vowels are underlined if known. Glosses are not included if not found in the reference.)

(22) Some examples which fall into types A-E

A	Efik (Archangeli and Pulleyblank (in press))	**All PoAs:** /bɛ́d/ ɛ̀-bɛ̀d ‘wait (2nd sg)’, /káŋ/ à-kàŋ ‘deny (2nd sg)’, /wɔ́k/ ɔ̀-wɔ̀k ‘swim (2nd sg)’, /dóm/ ò-dòm ‘bite (2nd sg)’, /twák/ à-twàk ‘hit, tug (2nd sg)’
	Takelma (Sapir (1921: 60-1))	**All PoAs:** yabas ‘maggot’, yalaq ‘gray (of hair)’, hakwak ‘as if’, witin ‘blood’, eqe ‘to die (plur.)’, ehe ‘gone’, maha ‘to scare’, wehel ‘stomach’, mahai ‘large’
B	Najdi Bedouin Arabic (Gafos and Lombardi (1999: 83))	**Coronal:** jalas *jilas ‘he sat’, jaraf ‘he washed away’, šanag ‘he beheaded’, begarak ‘your (m.sg.) cattle’ **Pharyngeal:** daʕas ‘he trampled’, šaħað ‘he begged’ **Glottal:** saʔal ‘he asked’ **Not elsewhere:** /kitab/ kitab ‘he wrote’, /rafaagah/ rifaagah ‘companions’
C	Ge‘ez (McCarthy (1991: 75))	**Uvular:** yiʔiχχiz **Pharyngeal:** yɨbiʕʕɨl, yɨsiħħɨt **Glottal:** yɨliʔʔɨk, yɨlihhɨq **Not elsewhere:** yinabbir
	Iraqw (Rose (1996: 77-8))	**Pharyngeal:** ufaħaam ‘blow (durative)’ **Glottal:** buʔuum ‘harvest pay (durative)’, waʔalahaam ‘exchange (durative)’ **Not elsewhere:** tutuwiim ‘open a new farm (durative)’
	Tiberian Hebrew (McCarthy (1994: 215))	**Pharyngeal:** jaʕ[ă]mo:d ‘he will stand’, jeħ[ĕ]zaq ‘he is strong’, joʕ[ŏ]mad ‘he is made to stand’ **Glottal:** jah[ă]po:k ‘he will turn’, jeʔ[ĕ]so:p ‘he will gather’
D	Arbore (Hayward (1984: 73))	**Glottal:** /méh-a/ mẹ̯ḥẹ ‘(these) are pieces of property’, /geréʔ-a/ geṛéʔẹ̯ ‘(it) is a belly’ **Not elsewhere:** /fóol-a/ hoola ‘(it) is a face’
	Japanese loanwords (Hall (2003: 90))	**Glottal:** bahh[a] ‘Bach’, gohh[o] ‘Gogh’ **Not elsewhere:** baz[u] ‘buzz’, s[u]p[u]rait[o] ‘Sprite’
	Kashaya[1] (Rose (1996: 100-1))	**Glottal:** siʔi ‘flesh’, heʔén ‘how’, maʔa ‘food, eat’, ʔoho ‘fire, light, hot’, yuhu ‘pinole’, nihîn ‘to oneself’
E	English	(No example of VH.)

Examples in this list are solely based on transparency types (20), thus they are not uniform in many other respects such as phonological/morphological/syntactic environments, directionality, type of analysis, etc. But they all show that VPlace is shared between trigger and target, and the sets of transparent consonants across languages are not just random. Note also that the transparency continuum here may be ascribed to the consonant’s “featural independence” from the harmonic features of vowel (Archangeli and Pulleyblank (in press: Section 15.8.3).

It is confirmed that five transparency types are attested as the model predicts. Importantly, the distinction between C and D is born out from the subdivision of *K and *Q.

7. Conclusion

With the revised PoA hierarchy, the Conflation Theory would capture a wider range of attested types of VH. The model proposed in this paper has the following benefits: (i) there is no need to postulate a language-specific markedness reversal (contra Yamane-Tanaka

(2006)), (ii) typology of consonant transparency in VH can be properly captured, (iii) ambivalence of uvulars (Trigo (1991: 121-28), McCarthy (1994: 227), Rose (1996: 100), Mielke (2004)) would result simply from the ranking difference, rather than feature geometric specifications.

There are also remaining issues concerning hierarchy (13b). It may make an anomalous prediction for segment inventory: In this hierarchy, the existence of coronal may imply the existence of uvular, but this is not empirically true (cf. UPSID). For now I assume that the markedness hierarchy for VH is different from the markedness hierarchy for segment inventories. A similar view is already suggested by Pulleyblank (2006b), who notes that the fixed harmonic scale for nasal harmony for instance, which can be ascribed to the similarity between the trigger and the target, is independent from the markedness hierarchy for nasal segment inventory. De Lacy (2002: 185-87) also notices that, in a segment inventory, almost no implicational relation holds between *any* pair of PoAs, even for the widely-assumed scale *labial » *coronal, suggesting that segment inventory works only as a diagnostics for *the least marked* element in a scale (ibid: Sections 6.3, 6.4).

In a wider context, de Lacy (2006: 45) suggests that *sub*segmental hierarchies such as **PoA, voicing** and **nasality** remain *constant* in every environment, while *supra*segmental hierarchies such as **sonority** and **tone** *always* combine with prosodic constituents and are sensitive to their prosodic environment. However, as de Lacy (2006: 408) admits, it is still unclear (i) whether such a combinatorial asymmetry is a stipulation or it derives from deeper principle,[2] (ii) whether categories in different markedness hierarchies can conflate with each other, and (iii) how restrictive the local conjunction should be. All these questions are postponed to future research.

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Notes

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[1] De Lacy (2006: 219-23) ranks *Q above *{K, P, T} in the treatment of debuccalization of uvular in Kashaya.

[2] Pulleyblank (2004) discusses a further possibility that even a suprasegmental feature such as tone could have "two scales, one when *not* combined with a prosodic scale and a different one when combined with a prosodic scale".

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