

Kashaya [asp] Assimilation and Dissimilation by Correspondence

EUGENE BUCKLEY

UNIVERSITY OF PENNSYLVANIA

Linguistic Society of America

Austin, Texas

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The issue in brief

- Kashaya has **dissimilation** of [asp]
 - aspirated $C^h \rightarrow C$ before aspirated C^h
 - familiar from Grassmann's Law, etc.
- Also has **assimilation** of [asp]
 - aspirated $C^h \rightarrow C$ before plain C
 - nonlocal harmony
- **Same** output, **opposite** trigger, same morphology
 - proposed solution using formalism of Agreement by Correspondence
 - unifies the two phenomena

BACKGROUND

Pomoan languages



Kashaya consonant inventory

p	t	ɬ	c	k	q	
p ^h	t ^h	ɬ ^h	c ^h	k ^h	q ^h	h

voiceless
unaspirated

voiceless
aspirated

p' t' ɬ' c' k' q' ?

b d

s š

s'

m n

w l y

t = lamino-dental
ɬ = apico-alveolar
c = phonetically [tʃ]

Instrumental prefixes

- 20 verb prefixes
 - all are **CV** in shape
 - they express the way in which action was performed, or how an event occurred
 - there is also a **zero** prefix, ignored here
 - not common
 - often passive meaning
- Obligatory with well over 800 roots
 - some roots occur with any prefix
 - many occur with a few, or some just one prefix

Kashaya prefixes

ba- with mouth, by speech

bi- by encircling, by sewing

ca- with rear end; with knife

cu- with round object; by water

c^hi- by holding part of object

da- with hand; by waves

di- by gravity, by weight

du- with finger

ha- with swinging motion

hi- with body, shoulder

ma- with sole of foot

mi- by kicking, by smelling

mu- with heat or energy

p^ha- with end of long object

p^hi- with side of long object

p^hu- by blowing

qa- between forces, with teeth

si- by water, by drinking

ša- with long object lengthwise

šu- by pulling or pushing

Prefixes containing voiceless stops

- Three **unaspirated**
 - *ca- cu- qa-*
 - these never become aspirated
- Four **aspirated**
 - *c^hi- p^ha- p^hi- p^hu-*
 - these can become **unaspirated**
- Dissimilation → plain *C*
 - when following consonant is *C^h* or *h*
- Assimilation → plain *C*
 - when following consonant is *C*

Source of data

- Dictionary database
 - in progress; about 17,000 entries
 - based mainly on manuscript by Robert Oswalt
- 952 bases with an underlyingly aspirated prefix
 - BASE = prefix + root
- 513 distinct roots that take C^hV -
 - attested with at least one of the four aspirated prefixes
- Copious examples for each prefix
 - c^hi - 186 ; p^ha - 196 ; p^hi - 337 ; p^hu - 233

DISSIMILATION

Dissimilation of [asp]

- Described in literature on Kashaya
 - $C^hV-C^h\dots \rightarrow CV-C^h\dots$
 - Oswalt 1961, Buckley 1994
- Familiar pattern from many languages
 - “robustly attested” (Bennett 2013)
 - Grassmann’s Law in Greek and Sanskrit
- Greek root alternations and reduplication

$t^hrik^h-es \rightarrow trik^h-es$ ‘hairs’

cf. t^hrik-s ‘hair’

$p^he-p^heug-a \rightarrow pe-p^heug-a$ ‘I have fled’

Aspirated prefixes: Unchanged

Aspiration **kept** before an ejective, voiced stop, or sonorant:

c^hi-k'is- 'mark with tool; write'

c^hi-ma- 'scoop'

p^ha-s'im- 'fold with end of stick'

p^ha-dul- 'be beyond reach with stick'

p^hi-c'o-- 'uncover with hoe'

p^hi-lu·m- 'swat'

p^hu-ṭ'a·š- 'blow hair off forehead'

p^hu-waṭ^h- 'weaken by blowing'

Aspirated prefixes: Dissimilated

Aspiration **lost** before an aspirated stop or /h/:

ci-q^ha·m- ‘wipe with mop’

ci-p^hu·- ‘stir up dust by dragging’

pa-c^hi·ṭ- ‘take out with end of stick’

pa-hol- ‘search by poking’

pi-ṭ^he·- ‘spread with edge of stick’

pi-t^hil- ‘tear with stick’

pu-k^heṭ- ‘spread apart by blowing’

pu-ṭ^ha·l- ‘be bright as clouds blow away’

Dissimilation and the OCP

- Traditionally seen as an OCP-type effect
 - prohibition on adjacent repetition of a feature



- First consonant is always part of prefix
 - second is always part of root
- Directionality by **FAITH(ROOT) >> FAITH(AFFIX)**
 - McCarthy & Prince 1995; cf. Baković 2000, Hansson 2001

ASSIMILATION

Assimilation of [asp]

- Not described in literature on Kashaya
 - a few examples noted and treated as exceptions
 - but dictionary data show it is well attested
- Regular process
 - 67 examples of assimilation in underlying $C^hV-CV...$
 - with 41 distinct roots
 - involving all four prefixes
 - 72 examples of dissimilation in $C^hV-C^hV...$
 - comparable frequency
 - excludes laryngeal increments, discussed below

Assimilation as Harmony

- Nonlocal harmony
 - compare well known coronal harmony [s] ~ [ʃ]
 - but also found with laryngeal features
- Example of Zulu roots
 - stops agree in laryngeal features
 - Khumalo 1987; Hansson 2001
 - not alternating, but enforced in loanwords

-peta

‘dig up’

-guba

‘dig’

-p^hat^ha-

‘hold’

-k^hot^ho

‘court’



Aspirated prefixes: Assimilated

Aspiration **lost** before a **plain** voiceless stop:

ci-kim- ‘catch on something’

ci-pe-l- ‘spread with tool’

pa-co- ‘crush with pestle’

pa-ṭi- ‘make pounding noise’

pi-ku-ṭ- ‘knock off with stick’

pi-tul- ‘straighten with hammer’

pu-pa- ‘(wind) cover with debris’

pu-ṭa-m- ‘wind make hammering noise’

Plain prefixes: Unchanged

Never aspirated, regardless of the following consonant:

⇒ ca-q ^h a-ṭ-	‘be comfortable to sit on’
ca-ṭ’u-	‘sit and sink into something’
ca-kan-	‘(part of body) stick out’
<hr/>	
⇒ cu-c ^h u-	‘scrape with brush’
cu-ba-l-	‘wipe with round object’
cu-nem-	‘bump into with car, head, shoulder’
<hr/>	
⇒ qa-q ^h al-	‘drag with teeth’
qa-ce-	‘grab with teeth’
qa-lac-	‘try to bite and miss’

no interaction with
following aspiration

ANALYSIS OF ASSIMILATION

Observations

- Assimilation only when it would yield **CV-** prefix
 - not, of course, when it would yield **C^hV-C^hV...**
 - exactly what dissimilation eliminates in the same morphological context
- **OCP** for dissimilation is of no use here
 - entirely different featural interaction
- Superficially the opposite of dissimilation
 - yet the two processes yield the **same result**
 - so consider a shared mechanism for both:
Surface Correspondence

Agreement by Correspondence

- Assimilation between **similar** segments
 - Rose & Walker 2004, Hansson 2001
 - in Kashaya: voiceless, non-glottalized stops
- CORR **surface relation** between similar segments
 - sets up locus of agreement
- Constraints are **ranked** by degree of similarity
 - same place, same aspiration: **CORR-T \leftrightarrow T**
 - place is irrelevant in Kashaya
 - different place, same aspiration: **CORR-K^h \leftrightarrow T^h**
 - different place, different aspiration: **CORR-K^h \leftrightarrow T**

Identity constraints

- Identity among segments in correspondence
 - enforced by CC·IDENT specific to a feature
- **CC·IDENT-[asp]**
 - consonants in correspondence agree in [asp]
 - operates on the output representation
- Not relevant without the **CORR** constraint
 - relies on that constraint to set up relation
- Different from **plain IDENT**
 - that refers to input-output faithfulness

Generating Assimilation

- Similar stops must be in correspondence
- Because they are in correspondence, they must be identical for [asp]
- Change is in the prefix due to higher Root faithfulness

/p^ha-tul/	IDENT-RT- [asp]	CC-IDENT- [asp]	CORR- K^h↔T^h	CORR- K^h↔T	IDENT- [asp]
a. p^ha-tul				*!	
b. p^ha-tul {p^h t}		*!			
c. p^ha-t^hul {p^h t^h}	*!				*
☞ d. pa-tul {p t}					*

ANALYSIS OF DISSIMILATION

Dissimilation by Correspondence

- Agreement by Correspondence has been used to account for **dissimilation**
 - Bennett 2013, 2015, Bennett & Rose 2016, Ozburn & Kochetov 2013
 - promises a **unified** treatment of Kashaya
- Correspondence across prefix-stem boundary penalized by **CC-EDGE-(STEM)**
 - among other possible edges where dissimilation can occur
 - such as *syllable* for morpheme-internal dissimilation
 - conflicts with CORR requirement if segments are similar
- Dissimilation **reduces similarity** to resolve conflict
 - no role for OCP in this scenario

Basic approach to Dissimilation

- Similar stops should be in correspondence
- But correspondence is penalized across the prefix boundary
- So stops are made less similar by deleting [asp]

/p^ha-t^hil/	CC-IDENT- [asp]	CC-EDGE	CORR- K^h↔T^h	CORR- K^h↔T	IDENT- [asp]
a. p ^h a-t ^h il			*!	*	
b. p ^h a-t ^h il {p ^h t ^h }		*!			
c. pa-t ^h il				*	*

but this doesn't work for Kashaya...

Assimilation vs. dissimilation

- For **assimilation** in $/p^h \dots t/$, we must assume CORR between stops that differ in [asp]
 - Place is never relevant in the Kashaya pattern
- CORR- $K^h \leftrightarrow T$ plus IDENT-CC[asp] cause assimilation
 - create relation and enforce laryngeal identity
- By implication, more-similar $/p^h \dots t^h/$ is subject to **higher-ranked** constraint
 - CORR- $K^h \leftrightarrow T^h \gg$ CORR- $K^h \leftrightarrow T$
- But for **dissimilation** to happen, higher-ranked CORR- $K^h \leftrightarrow T^h$ must be blocked
 - since otherwise would force maintaining that identity

Challenge of Kashaya

- Existing analyses use **CC·EDGE** to bring about dissimilation
 - those languages have no correspondence across the Stem boundary
 - but in Kashaya, this incorrectly prevents assimilation
- Prefix-stem structure is **identical** for both dissimilation and assimilation
 - only difference is [asp] on the root-initial consonant
- There must be something **extra** in Kashaya
 - limits scope of CC·EDGE to the context where dissimilation occurs

Unified treatment

- Dissimilation, $C^h v C^h \rightarrow C v C^h$, yields the same pairing targeted by assimilation, $C^h v C \rightarrow C v C$
 - just in a different order
 - specifically penalize CORR relation when prefix has [asp]
- Deaspiration happens in two different ways
 - dissimilation of $C^h v - C^h$ to $C v - C^h$
 - makes them more dissimilar so correspondence is avoided
 - assimilation of $C^h v - C$ to $C v - C$ eliminate penalty
 - correspondence occurs and identity is effected
- What they share is avoidance of [asp] in prefix

Aspiration in prefixes

- Disfavor [asp] on prefix: ***PREF/[asp]**
 - less marked structures favored in affixes
 - compare unviolated ***PREF/[gl]**
 - Kashaya has no ejectives in prefixes
- Other unmarked aspects of Kashaya prefixes
 - all have the core **syllable** shape CV
 - contain just peripheral **vowels** /i u a/, not /e o/
- ***PREF/[asp]** has limited effect
 - only in context of assimilation and dissimilation
- Or perhaps IDENT-ROOT >> ***[asp]** >> IDENT-AFFIX
 - depends on analysis of (faithful) suffixal aspiration

Constraint conjunction

- In other dissimilation analyses, CC·EDGE is enough
 - since no assimilation occurs across prefix-stem
- In Kashaya, need to selectively **block** assimilation
 - cannot be permitted between [asp] consonants
- **Conjunction** of CC·EDGE-(STEM) with *PREF/[asp]
 - CORR across prefix-stem **and** aspiration in prefix
- **Locus** of joint violation is the initial C
 - bears prefixal [asp] and participates in CC relation
- Loss of [asp] reduces pressure for CORR
 - i.e. dissimilation satisfies the conjoined constraint

Generating Dissimilation

- Similar stops should be in correspondence
- But correspondence is penalized **with [asp]** across the prefix boundary
- So stops are made less similar by deleting [asp]

<i>/p^ha-t^hil/</i>	CC·IDENT- [asp]	*PREF/[asp] & CC·EDGE	CORR- K ^h ↔T ^h	CORR- K ^h ↔T	CC·EDGE	IDENT- [asp]
a. p ^h a-t ^h il			*!	*		
b. p ^h a-t ^h il <i>{p^h t^h}</i>		*!			*	
☞ c. pa-t ^h il				*		*
d. pa-t ^h il <i>{p t^h}</i>	*!				*	*

No assimilation for plain prefixes

- Matching plain C...C prevented by Root faithfulness
- Matching C^h...C^h would be dissimilation context
 - prevented by same conjoined constraint, not by OCP

<i>/cu-c^hu/</i>	IDENT-RT- [asp]	CC·IDENT- [asp]	*PREF/[asp] & CC·EDGE	CORR- K ^h ↔T ^h	CORR- K ^h ↔T	CC·EDGE
☞ a. cu-c^hu					*	
b. cu-cu <i>{c c}</i>	*!					*
c. c^hu-c^hu				*!	*	
d. c^hu-c^hu <i>{c^h c^h}</i>			*!			*

No untriggered loss of aspiration

- Other consonants have no correspondence
 - no pressure for CORR because consonants are too dissimilar
 - otherwise prevented by simple faithfulness

/p^ha-dul/	CC·IDENT-[asp]	*PREF/[asp] & CC·EDGE	CORR-K^h↔T^h	CORR-K^h↔T	CC·EDGE	IDENT-[asp]
☞ a. p ^h a-dul						
b. p ^h a-dul {p ^h d}		*			*	
c. pa-dul						*!
d. pa-dul {p d}						*!

Summary

- Unified analysis using surface correspondence
 - assimilation and dissimilation in one framework
- Rather than two entirely different methods
 - OCP plus some kind of agreement or spreading
 - would yield the same result for the prefix by coincidence
- How did this system come about?
 - neither process is found in the other Pomoan languages
 - now to a somewhat speculative answer . . .

LARYNGEAL INCREMENTS

Laryngeal increments

- Glottal h or $ʔ$ featurally tied to following C
 - behaves in some ways like single segment
 - Buckley 1994
- Aspirated C^h takes h to form hC^h
 - laryngeal feature [asp] matches
- Ejective C' takes $ʔ$ to form $ʔC'$
 - also /b d/, behave as if glottalized /m' n'/
- Either one can occur before sonorants
 - no laryngeal specification; but h twice as common
- Plain voiceless C overwhelmingly takes h
 - about 10 times the occurrence of $ʔ$

Decrement

Root-initial increment **deleted** in certain morphological contexts, such as the plural in various allomorphs:

da-**hc^ha-** ‘knock over with hand’

da-**c^ha-t-** ‘knock over several’

p^hi-**?c’on-** ‘detach with stick’

p^hi-**c’on-ta-** ‘detach several with stick’

du-**htay-** ‘touch with finger’

du-**tay-?ta-** ‘touch several times with finger’

ma-**?ya-** ‘almost smash with foot’

ma-**ya-t-** ‘almost smash several with foot’

Decrement and Aspiration

- Uniform prefix before /h/ with aspirate
 - pu-**hc^ha-** ‘blow over’
 - pu-**c^ha-t-** ‘blow several over’
- Non-uniform prefix before /h/ with sonorant
 - pi-**hye·-** ‘stop chopping’
 - p^hi-**ye-t-** ‘stop chopping several’
- Uniform prefix **if** plain stop triggers assimilation
 - ci-**htay-** ‘touch with tool’
 - ci-**tay-ʔta-** ‘touch several times with tool’

Extension to new context

- Prefix aspiration is uniform for aspirated, glottalized, and voiced stops
 - always **C^hV-** or **CV-** regardless of increment
- Assume plain stops originally didn't cause assimilation
 - aspiration in prefix would be inconsistent
- Yet the other stops have consistent prefixes
 - roots with /ht/ were deaspirated, as with /ht^h/
 - decremented /t/ also came to pattern with /t^h/ ?

Why just plain stops?

- Roots with sonorants show lower /h/ preference
 - around 2:1 rather than 10:1
 - less paradigmatic pressure

	Aspirated		Plain		Fricative		Ejective		Voiced Stop		Sonorant	
/h/	78	50.0%	92	49.5%	45	57.0%	1	0.4%	0	0.0%	47	30.5%
/ʔ/	7	4.5%	8	4.3%	1	1.3%	125	48.8%	32	52.5%	24	15.6%
none	71	45.5%	86	46.2%	33	41.8%	130	50.8%	29	47.5%	83	53.9%

- Yet not simply paradigm uniformity
 - otherwise should still happen with sonorants also
 - despite lower frequency of /h/

Conclusion

- Alternations like **-htay-** ~ **-tay-** were the seed
 - extended to forms like **-tul-**, which is never **-htul-**
- Only plain stops are susceptible to the assimilation analysis suggested here
 - sonorants are utterly different from aspirated stops
 - but /t/ and /t^h/ differ in just one feature
 - created an opening for learners to reanalyze the pattern
- Similarity of **T** to **T^h** plays crucial role
 - in synchronic analysis
 - and likely in diachronic development

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