Kashaya [asp] Assimilation and Dissimilation by Correspondence

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Linguistic Society of America
Austin, Texas

7 January 2017
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

<table>
<thead>
<tr>
<th></th>
<th>p</th>
<th>t</th>
<th>ṭ</th>
<th>c</th>
<th>k</th>
<th>q</th>
</tr>
</thead>
<tbody>
<tr>
<td>ph</td>
<td>pʰ</td>
<td>tʰ</td>
<td>ṭʰ</td>
<td>cʰ</td>
<td>kʰ</td>
<td>qʰ</td>
</tr>
<tr>
<td>p’</td>
<td>p’ʰ</td>
<td>t’ʰ</td>
<td>ṭ’ʰ</td>
<td>c’ʰ</td>
<td>k’ʰ</td>
<td>q’ʰ</td>
</tr>
<tr>
<td>b</td>
<td>b</td>
<td>d</td>
<td></td>
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<td>s</td>
<td>š</td>
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<td></td>
<td>s’</td>
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<td></td>
</tr>
<tr>
<td>m</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>w</td>
<td>w</td>
<td>l</td>
<td>y</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **p** = lamino-dental
- **ṭ** = apico-alveolar
- **c** = phonetically [tʃ]

**voiceless unaspirated**

**voiceless aspirated**
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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ba-</td>
<td>with mouth, by speech</td>
</tr>
<tr>
<td>bi-</td>
<td>by encircling, by sewing</td>
</tr>
<tr>
<td>ca-</td>
<td>with rear end; with knife</td>
</tr>
<tr>
<td>cu-</td>
<td>with round object; by water</td>
</tr>
<tr>
<td>ch'i-</td>
<td>by holding part of object</td>
</tr>
<tr>
<td>da-</td>
<td>with hand; by waves</td>
</tr>
<tr>
<td>di-</td>
<td>by gravity, by weight</td>
</tr>
<tr>
<td>du-</td>
<td>with finger</td>
</tr>
<tr>
<td>ha-</td>
<td>with swinging motion</td>
</tr>
<tr>
<td>hi-</td>
<td>with body, shoulder</td>
</tr>
<tr>
<td>ma-</td>
<td>with sole of foot</td>
</tr>
<tr>
<td>mi-</td>
<td>by kicking, by smelling</td>
</tr>
<tr>
<td>mu-</td>
<td>with heat or energy</td>
</tr>
<tr>
<td>pʰa-</td>
<td>with end of long object</td>
</tr>
<tr>
<td>pʰi-</td>
<td>with side of long object</td>
</tr>
<tr>
<td>pʰu-</td>
<td>by blowing</td>
</tr>
<tr>
<td>qa-</td>
<td>between forces, with teeth</td>
</tr>
<tr>
<td>si-</td>
<td>by water, by drinking</td>
</tr>
<tr>
<td>ša-</td>
<td>with long object lengthwise</td>
</tr>
<tr>
<td>šu-</td>
<td>by pulling or pushing</td>
</tr>
</tbody>
</table>
Prefixes containing voiceless stops

• Three unaspirated
  – ca- cu- qa-
  – these never become aspirated

• Four aspirated
  – cʰi- pʰa- pʰi- pʰu-
  – these can become unaspirated

• Dissimilation $\rightarrow$ plain C
  – when following consonant is $C^h$ or h

• Assimilation $\rightarrow$ 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 underlingly 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
  – $c^h$-i- 186 ; $p^h$-a- 196 ; $p^h$-i- 337 ; $p^h$-u- 233
DISSIMILATION
Dissimilation of [asp]

• Described in literature on Kashaya
  – $C^hV-C^h \ldots \rightarrow CV-C^h \ldots$
  – 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
  
  \[
  \begin{align*}
  t^h\text{rik}^h\text{-es} & \rightarrow \text{trik}^h\text{-es} & \text{‘hairs’} \\
  & \text{cf. } t^h\text{rik} \text{-s} & \text{‘hair’} \\
  p^h\text{e-p}^h\text{eug-a} & \rightarrow \text{pe-p}^h\text{eug-a} & \text{‘I have fled’}
  \end{align*}
  \]
## Aspirated prefixes: Unchanged

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cʰi-k’is-</td>
<td>‘mark with tool; write’</td>
</tr>
<tr>
<td>cʰi-ma-</td>
<td>‘scoop’</td>
</tr>
<tr>
<td>pʰa-s’im-</td>
<td>‘fold with end of stick’</td>
</tr>
<tr>
<td>pʰa-dul-</td>
<td>‘be beyond reach with stick’</td>
</tr>
<tr>
<td>pʰi-c’o--</td>
<td>‘uncover with hoe’</td>
</tr>
<tr>
<td>pʰi-lu·m-</td>
<td>‘swat’</td>
</tr>
<tr>
<td>pʰu-ṭ’a·š-</td>
<td>‘blow hair off forehead’</td>
</tr>
<tr>
<td>pʰu-waṭʰ-</td>
<td>‘weaken by blowing’</td>
</tr>
</tbody>
</table>
## Aspirated prefixes: Dissimililated

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ci-qʰa·m-</td>
<td>‘wipe with mop’</td>
</tr>
<tr>
<td>ci-pʰu-</td>
<td>‘stir up dust by dragging’</td>
</tr>
<tr>
<td>pa-cʰi·ṭ-</td>
<td>‘take out with end of stick’</td>
</tr>
<tr>
<td>pa-hol-</td>
<td>‘search by poking’</td>
</tr>
<tr>
<td>pi-ṭʰe·</td>
<td>‘spread with edge of stick’</td>
</tr>
<tr>
<td>pi-tʰil-</td>
<td>‘tear with stick’</td>
</tr>
<tr>
<td>pu-kʰeṭ-</td>
<td>‘spread apart by blowing’</td>
</tr>
<tr>
<td>pu-ṭʰa·l-</td>
<td>‘be bright as clouds blow away’</td>
</tr>
</tbody>
</table>
Dissimilation and the OCP

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

\[ * \begin{array}{ccc}
  \text{C} & \text{V} & \text{C} \\
  \text{[asp]} & \text{[asp]} \\
\end{array} \]

• First consonant is always part of prefix
  – second is always part of root

• Directionality by \textit{Faith(Root)} $>>$ \textit{Faith(Affix)}
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’
    -pʰatʰa- ‘hold’ -kʰotʰo ‘court’
Aspirated prefixes: Assimilated

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ci-kim-</td>
<td>‘catch on something’</td>
</tr>
<tr>
<td>ci-pe·l-</td>
<td>‘spread with tool’</td>
</tr>
<tr>
<td>pa-co-</td>
<td>‘crush with pestle’</td>
</tr>
<tr>
<td>pa-ṭi-</td>
<td>‘make pounding noise’</td>
</tr>
<tr>
<td>pi-ku·ṭ-</td>
<td>‘knock off with stick’</td>
</tr>
<tr>
<td>pi-tul-</td>
<td>‘straighten with hammer’</td>
</tr>
<tr>
<td>pu-pa-</td>
<td>‘(wind) cover with debris’</td>
</tr>
<tr>
<td>pu-ṭa·m-</td>
<td>‘wind make hammering noise’</td>
</tr>
</tbody>
</table>
Plain prefixes: Unchanged

Never aspirated, regardless of the following consonant:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ca-qʰa·t-</td>
<td>‘be comfortable to sit on’</td>
</tr>
<tr>
<td>ca-ṭ’u-</td>
<td>‘sit and sink into something’</td>
</tr>
<tr>
<td>ca-kan-</td>
<td>‘(part of body) stick out’</td>
</tr>
<tr>
<td>cu-cʰu-</td>
<td>‘scrape with brush’</td>
</tr>
<tr>
<td>cu-ba·l-</td>
<td>‘wipe with round object’</td>
</tr>
<tr>
<td>cu-nem-</td>
<td>‘bump into with car, head, shoulder’</td>
</tr>
<tr>
<td>qa-qʰa·l-</td>
<td>‘drag with teeth’</td>
</tr>
<tr>
<td>qa-ce-</td>
<td>‘grab with teeth’</td>
</tr>
<tr>
<td>qa-lac-</td>
<td>‘try to bite and miss’</td>
</tr>
</tbody>
</table>

*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
  – 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↔T
    • place is irrelevant in Kashaya
  – different place, same aspiration: Corr-Kʰ↔Tʰ
  – different place, different aspiration: Corr-Kʰ↔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

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>/pʰa-tul/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. pʰa-tul</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. pʰa-tul</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. pʰa-tʰul</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. pa-tul</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

- 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
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]`

<table>
<thead>
<tr>
<th>/pʰa-tʰɪl/</th>
<th>CC·IDENT-[asp]</th>
<th>CC·EDGE</th>
<th>CORR-Kʰ↔Tʰ</th>
<th>CORR-Kʰ↔T</th>
<th>IDENT-[asp]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pʰa-tʰɪl</td>
<td></td>
<td></td>
<td>![ast]</td>
<td>![ast]</td>
<td>![ast]</td>
</tr>
<tr>
<td>b. pʰa-tʰɪl {pʰ tʰ}</td>
<td></td>
<td>![ast]</td>
<td>![ast]</td>
<td>![ast]</td>
<td>![ast]</td>
</tr>
<tr>
<td>c. pa-tʰɪl</td>
<td></td>
<td></td>
<td>![ast]</td>
<td>![ast]</td>
<td>![ast]</td>
</tr>
</tbody>
</table>

* but this doesn’t work for Kashaya...
Assimilation vs. dissimilation

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

• Existing analyses use CC·E†DGE 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·E†DGE 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, $CC\cdot EDGE$ is enough
  – since no assimilation occurs across prefix-stem
• In Kashaya, need to selectively **block** assimilation
  – cannot be permitted between [asp] consonants
• **Conjunction** of $CC\cdot EDGE-(STEM)$ 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]

<table>
<thead>
<tr>
<th></th>
<th>CC·IDENT-[asp]</th>
<th>*PREF/[asp] &amp; CC·EDGE</th>
<th>CORR-K⁺↔Tʰ</th>
<th>CORR-Kʰ↔T</th>
<th>CC·EDGE</th>
<th>IDENT-[asp]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pʰa-tʰɪl</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
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</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
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<tr>
<td></td>
<td>pʰa-tʰɪl</td>
<td></td>
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<td>*</td>
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<td></td>
<td>{pʰ tʰ}</td>
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<tr>
<td>c.</td>
<td>pa-tʰɪl</td>
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<td>*</td>
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<tr>
<td>d.</td>
<td>pa-tʰɪl</td>
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<td>*</td>
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<td></td>
<td>{p tʰ}</td>
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</tbody>
</table>

• 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]
No assimilation for plain prefixes

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

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>a. cu-cʰu</td>
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<td>b. cu-cu</td>
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<td>{c c}</td>
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<td>c. cʰu-cʰu</td>
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<td>d. cʰu-cʰu</td>
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<tr>
<td>{cʰ cʰ}</td>
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</tr>
</tbody>
</table>

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

34
No untriggered loss of aspiration

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

<table>
<thead>
<tr>
<th>/pʰa-dul/</th>
<th>CC·IDENT-[asp]</th>
<th>*PREF/[asp] &amp; CC·EDGE</th>
<th>CORR-Kʰ↔Tʰ</th>
<th>CORR-Kʰ↔T</th>
<th>CC·EDGE</th>
<th>IDENT-[asp]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pʰa-dul</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. pʰa-dul</td>
<td></td>
<td>★</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>{pʰ d}</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
<td></td>
</tr>
<tr>
<td>c. pa-dul</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>d. pa-dul</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>{p d}</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
<td></td>
</tr>
</tbody>
</table>
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 ? 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 ? to form $?C'$
  – 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 ?
Decrement

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

<table>
<thead>
<tr>
<th>Increment</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>da-hcʰa-</td>
<td>‘knock over with hand’</td>
</tr>
<tr>
<td>da-cʰa-t-</td>
<td>‘knock over several’</td>
</tr>
<tr>
<td>pʰi-ʔc’on-</td>
<td>‘detach with stick’</td>
</tr>
<tr>
<td>pʰi-c’on-ta-</td>
<td>‘detach several with stick’</td>
</tr>
<tr>
<td>du-htay-</td>
<td>‘touch with finger’</td>
</tr>
<tr>
<td>du-tay-ʔta-</td>
<td>‘touch several times with finger’</td>
</tr>
<tr>
<td>ma-ʔya-</td>
<td>‘almost smash with foot’</td>
</tr>
<tr>
<td>ma-ya-t-</td>
<td>‘almost smash several with foot’</td>
</tr>
</tbody>
</table>
Decrement and Aspiration

• Uniform prefix before /h/ with aspirate
  pu-hcʰa- ‘blow over’
  pu-cʰa-t- ‘blow several over’

• Non-uniform prefix before /h/ with sonorant
  pi-hye- ‘stop chopping’
  pʰi-ye-t- ‘stop chopping several’

• Uniform prefix if plain stop triggers assimilation
  ci-hṭay- ‘touch with tool’
  ci-tayʔtta- ‘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

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

- 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 /tʰ/ differ in just one feature
  – created an opening for learners to reanalyze the pattern
• Similarity of T to Tʰ plays crucial role
  – in synchronic analysis
  – and likely in diachronic development
References


