Kashaya [asp] Assimilation and Dissimilation by Correspondence

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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

California

Northern

Eastern

Southeastern

Central

Southern

Kashaya
### Kashaya consonant inventory

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

- **p** = lamino-dental
- **t** = 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
<table>
<thead>
<tr>
<th>Kashaya Prefix</th>
<th>Description</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>chi-</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** → plain C
  – when following consonant is Cʰ 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
  – $C^hV-C^h... \rightarrow CV-C^h...$
  – 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
  
  $t^h\text{rik}^h\text{-es} \rightarrow \text{trik}^h\text{-es} \quad \text{‘hairs’}$
  
  $cf. \ t^h\text{rik}-s \quad \text{‘hair’}$
  
  $p^h\text{e-p}^h\text{eug}-a \rightarrow \text{pe-p}^h\text{eug}-a \quad \text{‘I have fled’}$
Aspirated prefixes: Unchanged

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</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

  * C V C
  
  [asp]   [asp]

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

• Directionality by \textsc{Faith(Root)} >> \textsc{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
      -pɛta ‘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·ṭ-</td>
<td>‘be comfortable to sit on’</td>
</tr>
<tr>
<td>ca-ṭʼu-</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-qʰal-</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 CʰV-CʰV...
  – 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>
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<th></th>
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</thead>
<tbody>
<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></td>
<td>{pʰ t}</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>
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<tr>
<td></td>
<td>{pʰ tʰ}</td>
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<td></td>
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<tr>
<td>d. pa-tul</td>
<td></td>
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<td></td>
<td>{p t}</td>
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</tr>
</tbody>
</table>
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-tʰil/</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-tʰil</td>
<td></td>
<td></td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td></td>
</tr>
<tr>
<td>b. pʰa-tʰil {pʰ tʰ}</td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td></td>
</tr>
<tr>
<td>c. pa-tʰil</td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td><img src="#" alt="Star!" /></td>
<td></td>
</tr>
</tbody>
</table>

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

• For **assimilation** in /pʰ...tʰ/, 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 /pʰ...tʰ/ is subject to **higher-ranked** constraint
  – $\text{CORR-K}^h\leftrightarrow T^h \gg \text{CORR-K}^h\leftrightarrow T$
• 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·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, $\text{CC} \cdot \text{EDGE}$ is enough
  - since no assimilation occurs across prefix-stem
- In Kashaya, need to selectively **block** assimilation
  - cannot be permitted between [asp] consonants
- **Conjunction** of $\text{CC} \cdot \text{EDGE} \cdot (\text{STEM})$ with $\text{*PREF*[asp]}$
  - $\text{CORR}$ 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 $\text{CORR}$
  - 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>/pʰa-tʰil/</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-tʰil</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. pʰa-tʰil</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>{pʰ tʰ}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. pa-tʰil</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d. pa-tʰil</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
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<tr>
<td></td>
<td>{p tʰ}</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
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>
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</thead>
<tbody>
<tr>
<td>a. cu-cʰu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. cu-cu</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>{c c}</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. cʰu-cʰu</td>
<td></td>
<td></td>
<td>!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. cʰu-cʰu</td>
<td>{cʰ cʰ}</td>
<td></td>
<td>!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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>
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<th>CORR-Kʰ↔Tʰ</th>
<th>CORR-Kʰ↔T</th>
<th>CC·EDGE</th>
<th>IDENT-[asp]</th>
</tr>
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<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 {pʰ d}</td>
<td>![ ]</td>
<td>![ ]</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>![ ]</td>
</tr>
<tr>
<td>c. pa-dul</td>
<td>![ ]</td>
<td>![ ]</td>
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<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>Root Form</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>pʰiʔc’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-tayʔta-</td>
<td>‘touch several times with finger’</td>
</tr>
<tr>
<td>maʔya-</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
  \(pu-\text{hc}^h\text{a}-\) ‘blow over’
  \(pu-\text{c}^h\text{a}-t-\) ‘blow several over’

• Non-uniform prefix before /h/ with sonorant
  \(\text{pi}-\text{hye}-\) ‘stop chopping’
  \(\text{p}^\text{h}i-\text{ye}-t-\) ‘stop chopping several’

• Uniform prefix if plain stop triggers assimilation
  \(ci-\text{htay}-\) ‘touch with tool’
  \(ci-\text{tay}-?\text{ta}-\) ‘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 50.0%</td>
<td>92 49.5%</td>
<td>45 57.0%</td>
<td>1 0.4%</td>
<td>0 0.0%</td>
<td>47 30.5%</td>
</tr>
<tr>
<td>/ʔ/</td>
<td>7 4.5%</td>
<td>8 4.3%</td>
<td>1 1.3%</td>
<td>125 48.8%</td>
<td>32 52.5%</td>
<td>24 15.6%</td>
</tr>
<tr>
<td>none</td>
<td>71 45.5%</td>
<td>86 46.2%</td>
<td>33 41.8%</td>
<td>130 50.8%</td>
<td>29 47.5%</td>
<td>83 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


