Witsuwit’en phonetics and phonology

LING 200
Spring 2006
Announcements

• Correction to homework #2 (due Thurs in section)
  5. all
  6. (a)-(g), (j)
  (rest of assignment remains the same)
Announcements

• Clickers
  – model
    • Responsive Innovations ResponseCard RF
    • available in bookstore, textbook section, check-out counter
  – set to channel 41
    • Press and release GO button
    • While light is flashing red and green, enter 41
    • Press and release GO again
    • Press and release 1/A button. If flashes yellow, confirms set to right channel.
Reminder

• Quiz on Ch. 7 (Phonology) is now open, closes Wed. noon
Organization

1. The Witsuwit’en language and Athabaskan family
2. Witsuwit’en phonetics
3. Witsuwit’en phonology
Witsuwit’en

- apx. 180 speakers
- a dialect of the Witsuwit’en-Babine language
- Athabaskan family
• variant spellings: Athapaskan, Athabascan, Athapascan

• about 37 lgs in this family

• estimated time-depth: 2500 years
Na-Dene

Tlingit  Proto-Athabaskan-Eyak

Eyak  Proto-Athabaskan

CAY  S.AK  Tset  CBC  PCA  NW Can  Sar  Apachean

Deg Xinag  Witsuwit’en  Tsek’ene

CAY = Central Alaska-Yukon; S.AK = S. Alaska; Tset = Tsetsaut, CBC = Central BC, PCA = Pacific Coast Athabaskan; NW Can = NW Canada; Sar = Sarcee
Some Witsuwit’en speakers

Mabel Forsythe

Lillian Morris, Peter John
A Witsuwit’en text

• Lillian and Mabel talking together
  – 2:39 conversation
  – recorded 1997
  – some background noise
  – what unfamiliar sounds do you hear?
Glottal stop [ʔ]

stop made at the glottis: vocal cords brought together so no air can pass through the glottis.

uh-oh [ʔəʔo]

Hawaii [həwajˈi]

button [bʌn]

important [ɪmˈpɔːrˌtənt]
[?] in Witsuwit’en

- [pe?] ‘dried fish’
- [ʔen] ‘he, she’
- [so?mpi] ‘no one’
- [c’әteʔni] ‘legend’
Some Witsuwit’en sounds

Ejective stops and affricates: transcribed [C’]

How to make a (canonical) velar ejective:

0. Make a velar stop.

1. Muscles of the pharynx contract, stiffening and pulling walls inward

2. Back of tongue moves down, releasing pressure

Make a glottal stop.
Ejective affricates

- $[\text{ts}'] = \text{ejective alveolar affricate}$
  - $[\text{pəts'əq}]$ ‘his little finger’
- Compare $[\text{ts}] = \text{voiceless alveolar affricate}$
  - $[\text{pətsəq}]$ ‘his outer ear’
- Waveforms: (waveform = acoustic graph of energy x time)
  - $[\text{pə t s 'ə q}]$
  - $[\text{pə t s ə q}]$
Ejective stops

• \([t']\) = ejective alveolar stop
  
  – \([nt'əq]\) ‘your collarbone’

• Compare \([t]\) = voiceless alveolar stop
  
  – \([ntəq]\) ‘up’
Uvular place of articulation

**Figure 1.4** Places of articulation: 1 Bilabial; 2 Labiodental; 3 Dental; 4 Alveolar; 5 Retroflex; 6 Palato-Alveolar; 7 Palatal; 8 Velar.
Uvular place of articulation

• \([q]\) = voiceless uvular stop
  – \([q\text{is}]\) ‘Chinook salmon’
  – \([q\text{əχ}]\) ‘rabbit’
  – \([n\text{təq}]\) ‘up’

• \([q^h]\) = voiceless aspirated uvular stop
  – \([q^h\text{ε}]\) ‘footwear’

• \([q^\prime]\) = voiceless uvular ejective (stop)
  – \([q^\prime\text{əχ}]\) ‘backwards’

• \([χ]\) = voiceless uvular fricative
  – \([χ\text{ε}]\) ‘grease’

• \([κ]\) = (voiced) uvular approximant
  – \([pʰtən\text{e}]\) ‘he’s cooking’
Palatal place of articulation

**Figure 1.4** Places of articulation: 1 Bilabial; 2 Labiodental; 3 Dental; 4 Alveolar; 5 Retroflex; 6 Palato-Alveolar; 7 Palatal; 8 Velar.
Palatal place of articulation

- [c] = voiceless palatal stop
  - [cəs] ‘hook’
  - [nece] ‘it healed’
  - [weç’təs] ‘I’m not strong’
- [ch] = voiceless aspirated palatal stop
  - [cʰəs] ‘down feather’
- [c’] = palatal ejective (stop)
  - [c’əʃ’təj] ‘gun’
- [ç] = voiceless palatal fricative
  - [lɔztʰəç] ‘knife’
  - [nəteç] ‘he’s dancing’
- [j] = (voiced) palatal glide
Labio-velar place of articulation

**Figure 1.4** Places of articulation: 1 Bilabial; 2 Labiodental; 3 Dental; 4 Alveolar; 5 Retroflex; 6 Palato-Alveolar; 7 Palatal; 8 Velar.
Labio-velar place of articulation

• \([kw] = \text{voiceless labio-velar stop}\)
  – \([kw\,\epsilon\,\text{\varepsilon}]\) ‘bag’

• \([k^\text{wh}] = \text{voiceless aspirated labio-velar stop}\)
  – \([k^\text{wh}\,\epsilon\,\text{\varepsilon}]\) ‘fire’

• \([k^\text{w}\,\text{\prime}] = \text{labio-velar ejective (stop)}\)
  – \([k^\text{w}\,\text{\prime}\,\text{is}]\) (personal name)
  – \([k^\text{w}\,\epsilon\,\text{s\,\varepsilon}]\) ‘bead’

• \([x^w] = \text{voiceless labio-velar fricative}\)
  – \([x^w\,\epsilon\,\text{\varepsilon}]\) ‘thorn’

• \([w] = \text{(voiced) labio-velar glide}\)
  – \([n\,\epsilon\,w\,\epsilon\,\text{\varepsilon}]\) ‘soapberry’
Lateral fricative and affricates

- \[ l \] = (voiced) lateral approximant
  - \[ ləz\textsuperscript{h}əç \] ‘knife’
- \[ l̡ \] = voiceless lateral fricative
  - \[ l̡əjəl \] ‘it’s white; goat (lit. ‘that which is white’)’
- \[ tɬ \] = voiceless lateral affricate
  - \[ sətɬet \] ‘it’s licking me’
- \[ tɬ\textsuperscript{h} \] = voiceless aspirated lateral affricate
  - \[ nəcɬɬ\textsuperscript{h}əs \] ‘I’m kneading it’
- \[ tɬ’ \] = ejective lateral affricate
  - \[ sətɬ’et \] ‘he farted’
## Witsuwit’en consonant chart

<table>
<thead>
<tr>
<th></th>
<th>labial</th>
<th>alveolar</th>
<th>palatal</th>
<th>labio-velar</th>
<th>uvular</th>
<th>glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>stops</strong></td>
<td>p p’</td>
<td>t tʰ t’</td>
<td>c cʰ c’</td>
<td>kʰ kʰh kʰ’</td>
<td>q qʰ q’</td>
<td>?</td>
</tr>
<tr>
<td><strong>affricates</strong></td>
<td>ts tsʰ ts’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>lateral</strong></td>
<td>tɬ tɬʰ tɬ’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>fricatives</strong></td>
<td></td>
<td>s z</td>
<td>ç</td>
<td>xʰ</td>
<td>χ</td>
<td>h</td>
</tr>
<tr>
<td><strong>lateral</strong></td>
<td></td>
<td>ɬ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>nasals</strong></td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>approximants</strong></td>
<td></td>
<td>j</td>
<td>w</td>
<td></td>
<td>δ</td>
<td></td>
</tr>
<tr>
<td><strong>lateral</strong></td>
<td></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Witsuwit’en vowels

<table>
<thead>
<tr>
<th></th>
<th>front</th>
<th>central</th>
<th>back</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>unrounded</td>
<td>unrounded</td>
<td>rounded</td>
</tr>
<tr>
<td>high</td>
<td>i</td>
<td></td>
<td>u</td>
</tr>
<tr>
<td>mid</td>
<td>higher-mid</td>
<td>e</td>
<td>œ</td>
</tr>
<tr>
<td></td>
<td>lower-mid</td>
<td>ε</td>
<td></td>
</tr>
<tr>
<td>low</td>
<td>æ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Further details about Witsuwit’en sounds

- [təz] ‘driftwood’
- [tʰʌz] ‘cane’

Why wasn’t [ʌ] listed in the vowel inventory for Witsuwit’en?

- *Answer*: [ʌ] is a predictable detail about the pronunciation of Witsuwit’en, and predictable information is usually omitted.
Broad vs. narrow transcription

• A transcription can vary in the amount of phonetic detail included
  – Relatively a lot of detail: *narrow transcription*
    • e.g. \([t^h\Lambda z]\) ‘cane’ \([t\varepsilon z]\) ‘driftwood’
  – Relatively less detail: *broad transcription*
    • e.g. \([t^h\varepsilon z]\) ‘cane’ \([t\varepsilon z]\) ‘driftwood’

• When should \([\Lambda]\) be included in a transcription of Witsuwit’en?
Languages contain predictable vs. unpredictable information

- Unpredictable, list-like information
  - this kind of information represented in dictionary
- Predictable, rule-like information
  - e.g. in Witsuwit’en, schwa is pronounced as a lower-mid central vowel (in one context)
  - this kind of information represented in grammar
Broadest transcription

- Represents only unpredictable information

- **Phonemic representation:** \( /^{th}əz/ \)
  - phonological rules
  - e.g. lower vowel \( \Lambda \)
  - **Phonetic representation:** \( {^{th}Λz} \)

- **Phonemes:** the elements of a phonemic representation (enclosed in slash brackets)
When to use broad vs. narrow transcription?

• Typically, transcription is as broad as possible
  – Symbols in consonant, vowel charts are phonemes

• In Witsuwit’en, [ʌ] would be transcribed only in a phonetic study of vowel quality (e.g. Ch. 4 of Hargus (to appear))
/ə/ Lowering

In Witsuwit’en, [ə] is pronounced [ʌ] after voiceless aspirated stops, ejective stops, or voiceless fricatives.
## Context for /ə/ Lowering

After any of:

<table>
<thead>
<tr>
<th></th>
<th>labial</th>
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<th>labio-velar</th>
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<tbody>
<tr>
<td><strong>stops</strong></td>
<td>p’</td>
<td>tʰ t’</td>
<td>cʰ c’</td>
<td>kʰ k’w’</td>
<td>qʰ q’</td>
<td>?</td>
</tr>
<tr>
<td><strong>affricates</strong></td>
<td>tsʰ ts’</td>
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<td></td>
<td></td>
<td></td>
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<td>tɬʰ tɬ’</td>
<td></td>
<td></td>
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<tr>
<td><strong>fricatives</strong></td>
<td>s</td>
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<td>χ</td>
<td>h</td>
<td></td>
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<td>ɼ</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>
Distribution of [ə], [ʌ] in Witsuwit’en

• [ə] occurs after

<table>
<thead>
<tr>
<th>p</th>
<th>t</th>
<th>c</th>
<th>k^w</th>
<th>q</th>
</tr>
</thead>
<tbody>
<tr>
<td>ts</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>tl</td>
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<td>z</td>
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<tr>
<td>l</td>
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</table>

• [ʌ] occurs after

<table>
<thead>
<tr>
<th>p’</th>
<th>t^h t’</th>
<th>c^h c’</th>
<th>k^wh k^w’</th>
<th>q^h q’</th>
<th>?</th>
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<tr>
<td>ts^h ts’</td>
<td></td>
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<td></td>
<td></td>
</tr>
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<td>χ</td>
<td>h</td>
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<td>d’</td>
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</table>
Distribution of [ə], [ʌ] in Witsuwit’en

All the places /ə/ can occur in Witsuwit’en

e.g. [təz], [mən], [pən], [pələt], [pəzəz]

e.g. [tʰəz], [θəz], [xʷəz], [ɬət], [səs]

etc.
Distribution of [ə], [ʌ] in Witsuwit’en

• The distribution of [ʌ] complements that of [ə].
• Or, [ʌ] and [ə] are in complementary distribution.
• Only the basic member of a set of sounds which are in complementary distribution is considered phonemic (appears in vowel chart, etc.).
Which of [ə], [ʌ] is more basic?

• Which of the contexts is “simpler”? e.g. reduces to natural class of sounds or single position within word
  – rule applies in simpler context

• (not easy to tell in this case from just the information provided so far; other facts suggest that [ʌ] is derived from /ə/)
Summing up [ə], [Λ] in Witsuwit’en

• these vowel *phones* in complementary distribution
• [Λ] derived by lowering rule
• Post-script
  – /o/ lowers to [ɔ] and /æ/ retracts to [ɑ] in the same context that /ə/ lowers to [Λ]
### Inventory of Witsuwit’en vowel phones

<table>
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<td>u</td>
</tr>
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<td><strong>mid</strong></td>
<td>e</td>
<td>ə</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>higher-mid</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>low</strong></td>
<td>æ</td>
<td>ʌ</td>
<td>a</td>
</tr>
</tbody>
</table>
Sounds which are not in complementary distribution

- Contrast, i.e. occur in the same context
  - [ɬ] vs. [l]
    - [ɬəɬ] ‘dam’
    - [ɬəl] ‘conifer’
  - [s] vs. [z]
    - [səzəs] ‘bag, case’
    - [səzəz] ‘hide, skin’
  - [m] vs. [p]
    - [mən] ‘roof’
    - [pən] ‘lake’
Applied phonology

The Witsuwit’en writing system represents the phonemes, not all of the phonetic sounds
– Designed by a missionary in the 70s for use on a typewriter
– Revised 1993 (by your professor)
<table>
<thead>
<tr>
<th>Word</th>
<th>Phonetic</th>
<th>Orthographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘driftwood’</td>
<td>[təz]</td>
<td>&lt;diz&gt;</td>
</tr>
<tr>
<td>‘cane’</td>
<td>[θɔz]</td>
<td>&lt;tiz&gt;</td>
</tr>
<tr>
<td>‘footwear’</td>
<td>[kʰɛ]</td>
<td>&lt;kë&gt;</td>
</tr>
<tr>
<td>‘grease’</td>
<td>[χɛ]</td>
<td>&lt;khë&gt;</td>
</tr>
<tr>
<td>‘straight up’</td>
<td>[ntəq]</td>
<td>&lt;ndik&gt;</td>
</tr>
<tr>
<td>‘your collarbone’</td>
<td>[nt’əq]</td>
<td>&lt;nt’ik&gt;</td>
</tr>
</tbody>
</table>
More detail

• As transcribed on a previous slide,
  – [cəs] ‘hook’
  – [chəs] ‘down feather’
• Why not
  – [cis] ‘hook’
  – [chʌs] ‘down feather’
Summary

• Phonetic transcription typically as streamlined as possible
• Predictable, rule-governed details are omitted
• Distribution is a major clue as to predictability
• Languages differ in
  – inventories of contrastive sounds
  – rules for pronunciation of sounds
## Phonetics vs. phonology

<table>
<thead>
<tr>
<th></th>
<th>Phonetics</th>
<th>Phonology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>transcription</strong></td>
<td>narrower okay</td>
<td>must be broad, streamlined</td>
</tr>
<tr>
<td><strong>phonetic detail</strong></td>
<td>explicitly represented</td>
<td>detail is predicted by rule system</td>
</tr>
<tr>
<td><strong>contrast</strong></td>
<td>how is a particular contrast realized?</td>
<td>what is contrastive?</td>
</tr>
<tr>
<td><strong>sounds</strong></td>
<td>what are articulatory, acoustic, perceptible properties?</td>
<td>how do sounds form patterns, classes?</td>
</tr>
</tbody>
</table>