# Elements

## Vocalic Elements in Consonants

# Consonants

- Glides are semivowels
- Hence, resonance pattern

# Consonants

- Resonance elements (3):
  - |l|: *dlp*
  - |U|: *rUmp*
  - |A|: *mAss*

# Consonants

- Resonance elements (3):
  - |I|: [i] ~ [j]
  - |U|: [u] ~ [w]
  - |A|: [a] ~ [r,…]

# Consonants

- Not all consonants have clear resonance patterns
  - e.g., stops, fricatives, glottals…
- How do listeners distinguish [t] from [p]?

# Consonants

- Obstruents are signaled by
  - Formant transitions into vowels
    - Noise Center of Gravity
      - Hence: Latin *factum* ~ Italian *fatto*
        - Consonant clusters become geminates

# Consonants

- Elements are defined by resonance pattern
- To identify elements in consonants, we can look at the vowel transitions
  - e.g. ata ~ apa ~ aka
- Or the noise CoG
  - e.g. asa ~ afa ~ axa

# Consonants

- There are three resonance elements
  - |I|, |U|, |A|
  - There are many more consonants…

# Consonants

- Two solutions:
  - Head vs. Dependent
  - Language specific representations
  - (complex resonance)

# Consonants

- How to determine consonant elements
  - Phonetic evidence
  - Phonological evidence

# Consonants

- Phonetic evidence
  - Resonance properties
    - *dlp, mAss, rUmp*
    - As in vowels, different properties of resonance can be important

# Consonants

- Phonological evidence:
  - Class behaviour
  - V~C interaction

# Consonants

- Class behaviour:
    - If segment X is subject to the same rules/constraints as segment Y, they must share structure
        - e.g., Ngiyambaa coronals
            - [d̻, n̻] vs. [d, n, l, r, ɻ]

# Consonants

- V~C interaction
  - e.g., Ngiyambaa
    - [d̪, n̪] → [ɟ, ɲ] / [i, j] _
    - |l| → |l̲| / |l̲| __

# Consonants

- Resonance elements in consonants:
  - |I| palatals and some coronals
  - |U| labials and velars
  - |A| gutturals and some coronals

# Consonants

- Place features

CONSONANTS (PULMONIC)

| | Bilabial | Labiodenta | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plosive | p b | | t d | | | ʈ ɖ | c ɟ | k g | q ɢ | | ʔ |
| Nasal | m | ɱ | n | | | ɳ | ɲ | ŋ | ɴ | | |
| Trill | ʙ | | r | | | | | | ʀ | | |
| Tap or Flap | | | ɾ | | | ɽ | | | | | |
| Fricative | ɸ β | f v | θ ð | s z | ʃ ʒ | ʂ ʐ | ç ʝ | x ɣ | χ ʁ | ħ ʕ | h ɦ |
| Lateral fricative | | | | ɬ ɮ | | | | | | | |
| Approximant | | ʋ | | ɹ | | ɻ | j | ɰ | | | |
| Lateral approximant | | | | l | | ɭ | ʎ | ʟ | | | |

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

# Consonants

- Resonance elements

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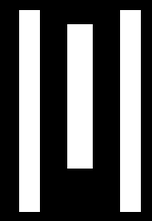
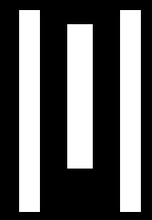
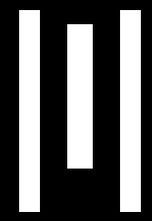


- Palatals and some coronals
  - Palatals interact with |I|-vowels
    - e.g., Ngiyambaa
- Coronals group with palatals
  - Bamike
    - V~C interaction and palatal ~ coronal class



- Phonetically, coronals and palatals are very similar
  - High F2, low F1



- Head - dependent
  - Dental and alveolar consonants are weaker
    - Epenthesis, deletion
    - Assimilation

# |U|

- |U| labials and velars
  - Articulatorily very distant
    - (But: affinity clear in labiovelars!)
- Acoustically, phonologically less so

# |ᴜ|

- Labials interact with vowels
  - Mapila Malayalam
    - pal ~ palɨ
    - jap ~ jappu

# |ʊ|

- Labials and velars interact
  - Latin clusters in Romanian
  - English final cluster reduction

# |U|

- Head - Dependent
  - Labials are |U|
    - Appear stronger (wide distribution, velar nasals are default in many languages)
    - V~C interactions: lowering of F3

# |U|

- Remember |U|-vowels
  - |U|
  - [y] ~ |I,U|

# |A|

- |A| gutturals and some coronals

# |A|

- Low vowels and gutturals interact
- V~C interaction in Salish

# |A|

- Low vowels and rhotics interact
  - e.g., V~C pairs in English

# |A|

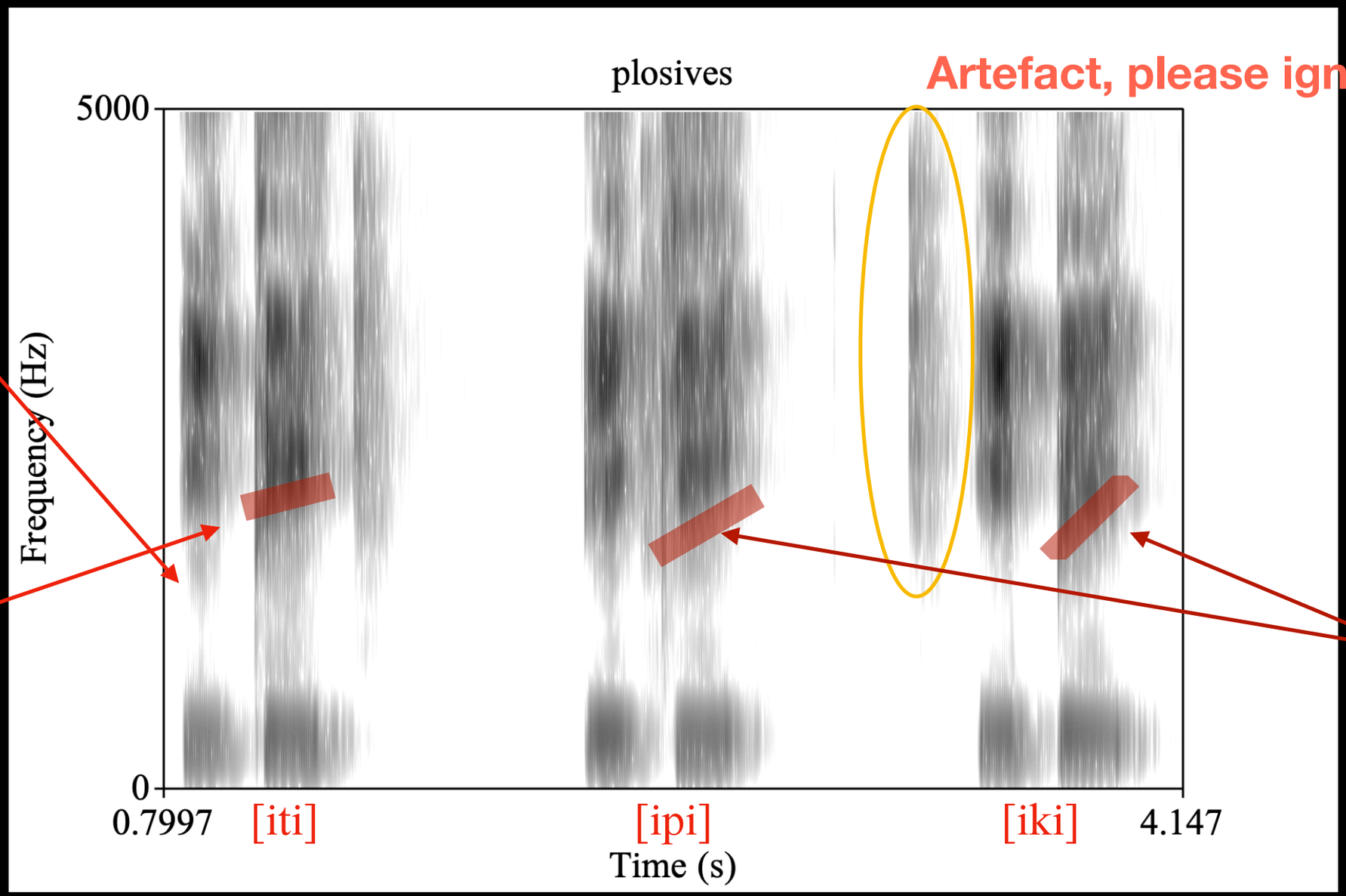
- The *mAss* pattern is less distinct
- Hence, more articulatory ways to achieve it

# Conclusion

- Three resonance elements account for all C-places
  - Head - Dependent
- Languages choose their own underlying representation

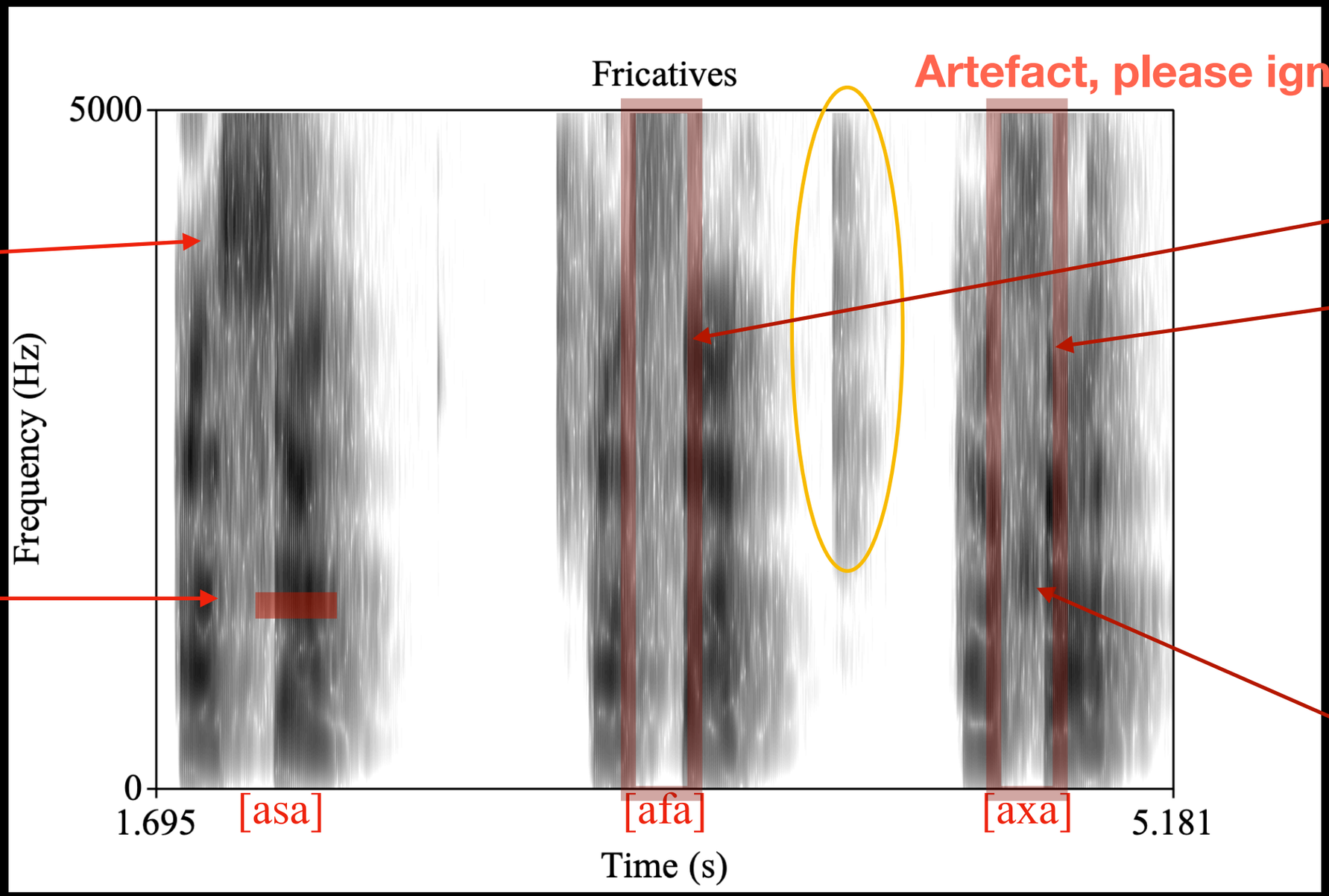
# Spectral examples

- Plosives (with the vowel [i])



# Spectral examples

- Fricatives (with the vowel [a])



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