Sonority is epiphenomenal

Phonotactics in the Onset Prominence framework

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Outline

- Preliminaries
  - "Who are your influences?"
- The OP representational environment
  - What is sonority and where does it come from?
- As many empirical patterns as we have time for
  - TR-type onsets and *tl restrictions, coda stop release (English and Polish), consonant syllabicity (Tashlhiyt Berber), trapped sonorants (Polish) . . . . .

Who are your influences?

- Those who focus on phonological representation
  - "If the representations are right . . . ." (McCarthy 1988)

- Anyone who has pursued the idea that manner of articulation is a prosodic feature
  - Steriade (1993); Golston & van der Hulst (1999); Pöchtrager (2006)

- Those who claim that ambiguities in the acoustic signal play a role in phonological evolution
  - Ohala (1981), Blevins (2004)

Manner as a structural property

- Aperture Theory (Steriade 1993)
  - Separate root nodes for stop closure (A_0), frication (A_f), stop release (A_{max})
- Golston & van der Hulst (1999)
  - 'Stricture is structure', sonority sequencing encoded in syllabic constituents

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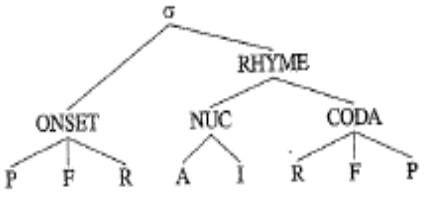
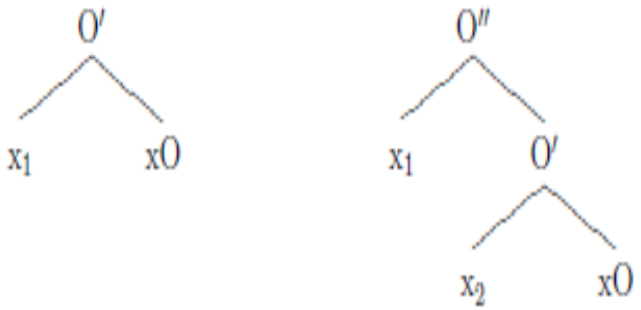


- Pöchtrager (2006)
  - No association lines between prosody and 'segments'; manner is structure, structure is manner; 'Melody' is place (and perhaps laryngeal) specification

(8) a. fricatives (preliminary) b. stops (preliminary)



Listener-induced sound change (Ohala 1981)

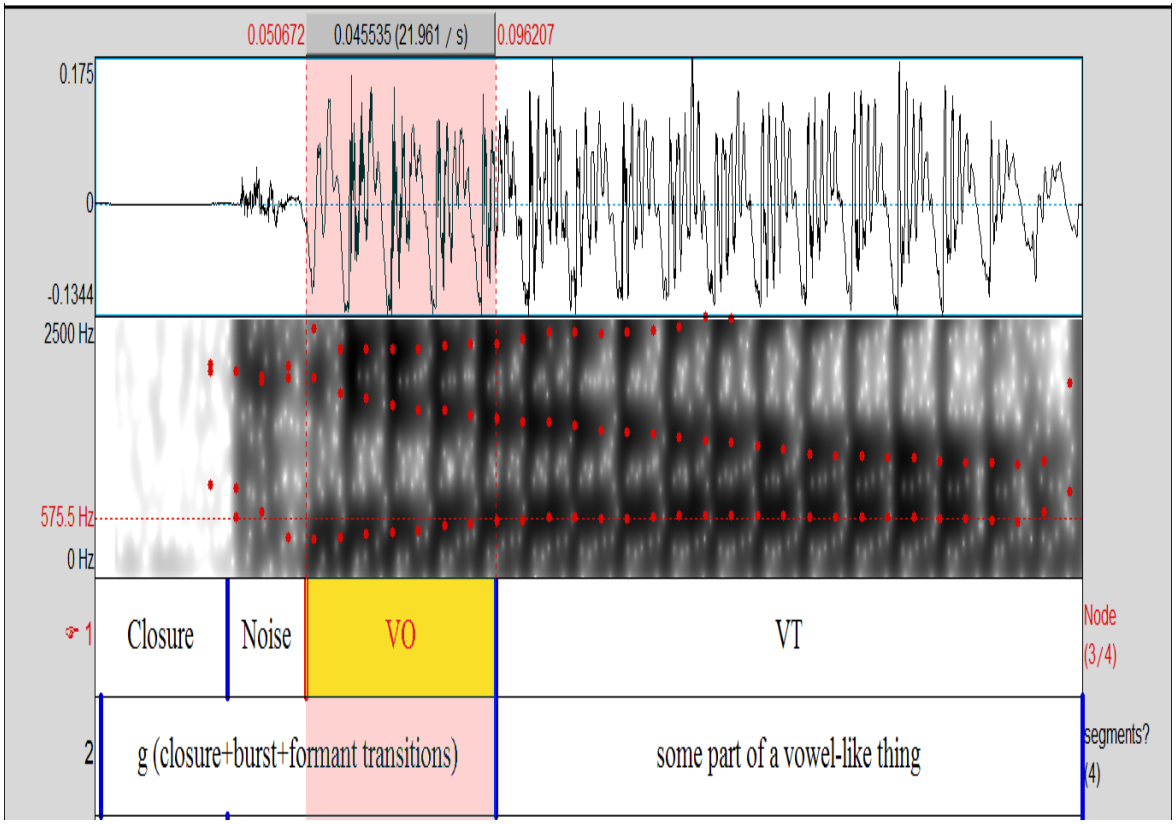
- The acoustic signal is ambiguous with regard to phonological representation
  - Listeners parse these ambiguities in various ways to drive phonological evolution (Blevins 2004)
- The evolutionary approach may benefit by paying more attention to synchronic representation
  - If the signal is ambiguous, shouldn't phonological representations be ambiguous as well?
  - Representational ambiguities create divergent parses to drive the evolution of phonotactic patterns

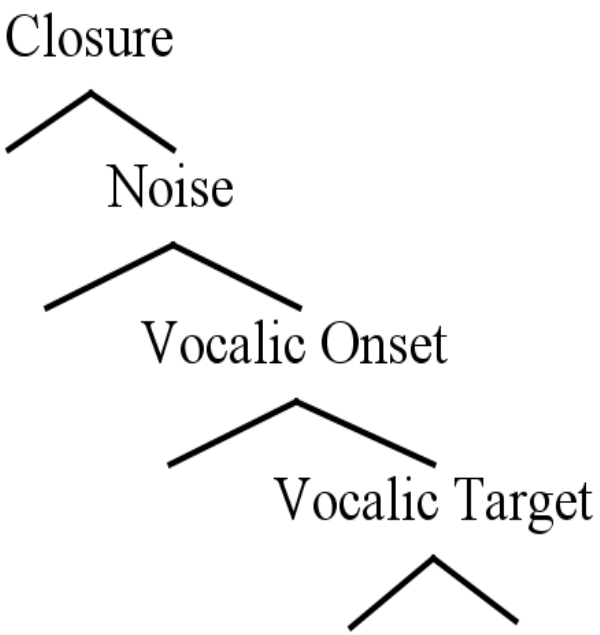
Preview of OP representations

- Both ‘syllables’ and ‘segments’ are emergent entities
- However, they both emerge from the same primitive representational hierarchy
  - They are built from the same materials
  - No need for any constraints on the segmental content of syllables; this is read directly off the representations
- Structures that diverge from the primitive motivate representational adjustments
  - Various types of phonological processes act as diagnostics for ‘adjusted’ structures

The OP hierarchy (Schwartz 2013)

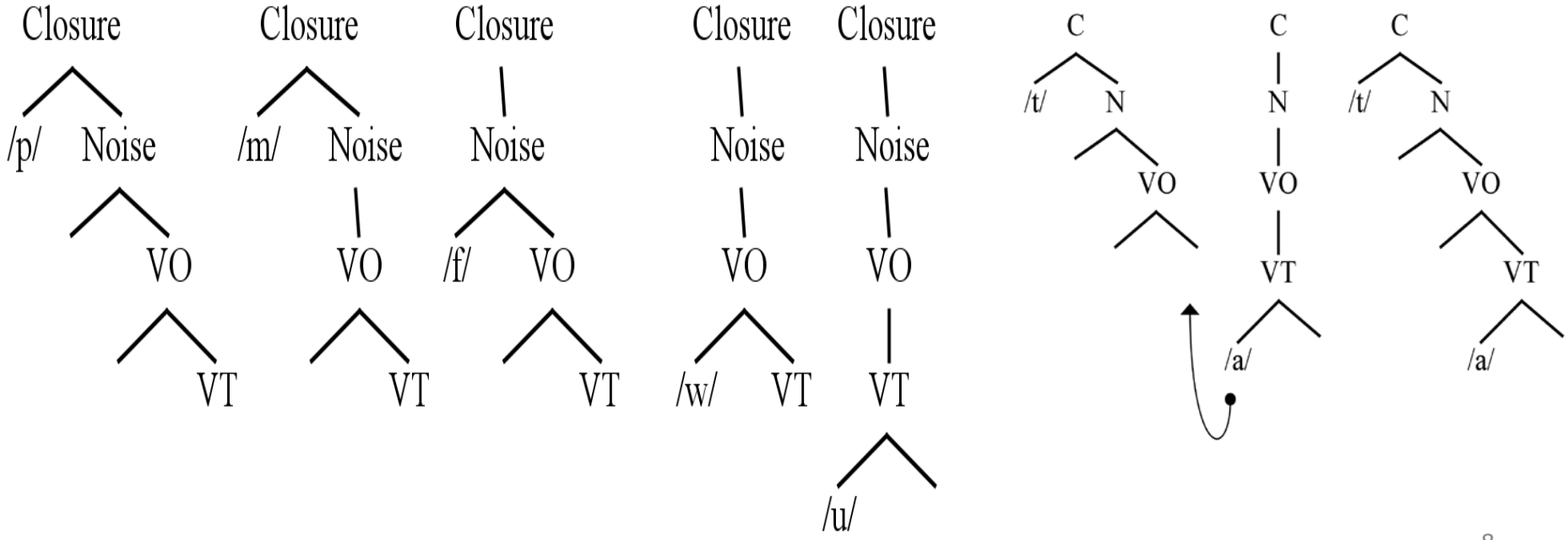
- Abstracted away from stop-vowel CV sequence
- Each layer derived from identifiable acoustic landmarks (cf. Stevens 2002) in a CV unit
- One-to-one relationship between hierarchy and acoustic landmarks, but NOT between the hierarchy and a segmental string, which is derivative





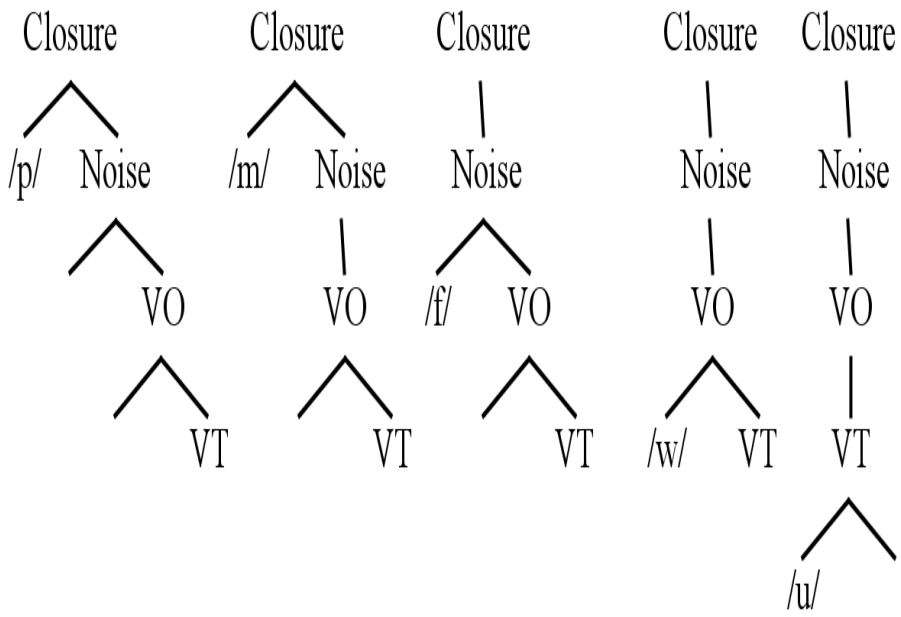
Deriving segments and putting them together

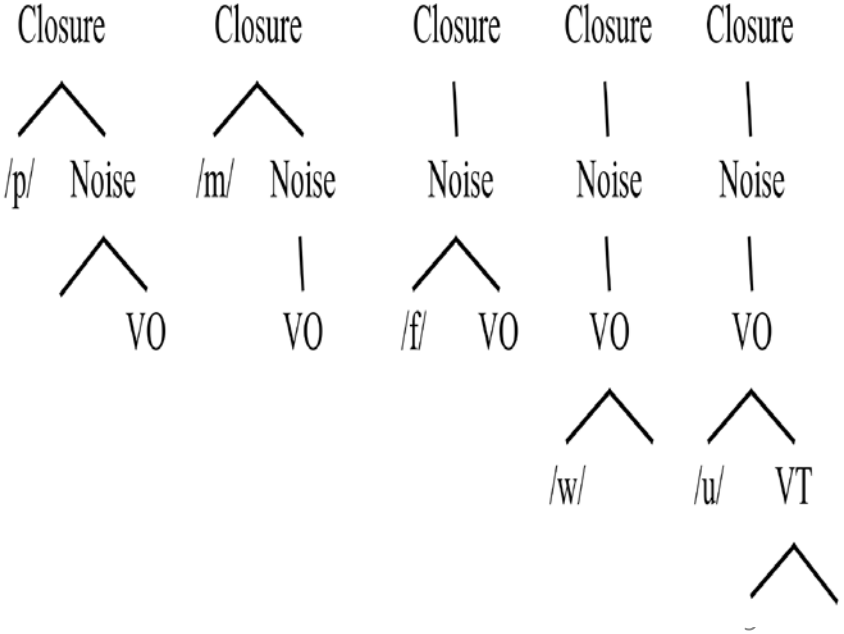
- Individual segmental structures are extracted from the OP hierarchy, encode manner and sonority (left); segmental symbols are shorthand for place & (in most cases) laryngeal specifications
- Most basic phonotactic mechanism is right-to-left *absorption* of lower-level vowels into higher-level consonants (right).
  - A single well-formedness condition, MINIMALCONSTITUENT (MC), motivates absorption
  - MC: A well-formed prosodic constituent contains active (binary) nodes containing medodic specification both above and below the VT level



Ambiguities in the system

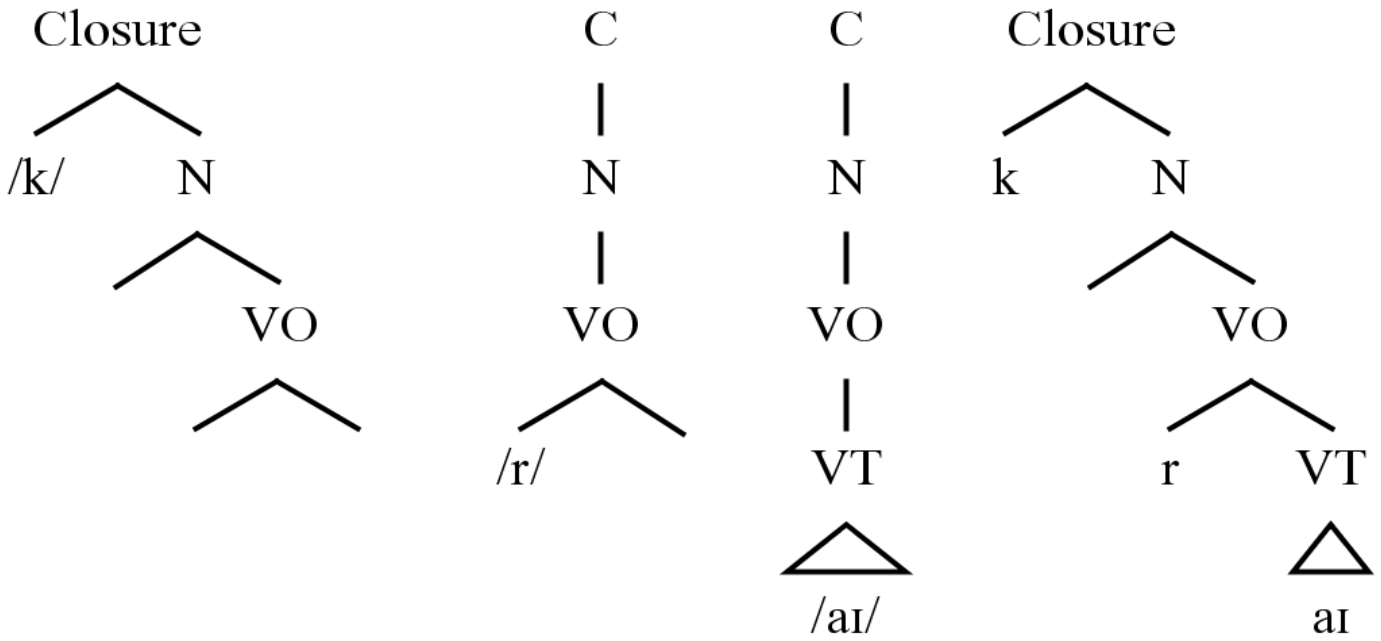
- Languages are forced into choices with regard to certain aspects of the OP representational system
  - The VO node may be present in the representation of consonants (left), or vowels (right)
  - Unary nodes create mismatches between 'segments' and structure; a stop-vowel sequence is structurally distinct from a liquid-vowel sequence
  - In other words, we can't talk about a universal sonority scale; languages make their own





Rising sonority in onsets - Absorption

- Below we see English *cry*
  - /kr/ contained in one constituent
  - *ComplexOnset: maximum of one segment's melody at VO level or above; violated in cry, but will be relevant later
- Not all 'rising sonority' onsets are absorbed
  - It will depend on the representation of the sonorant…

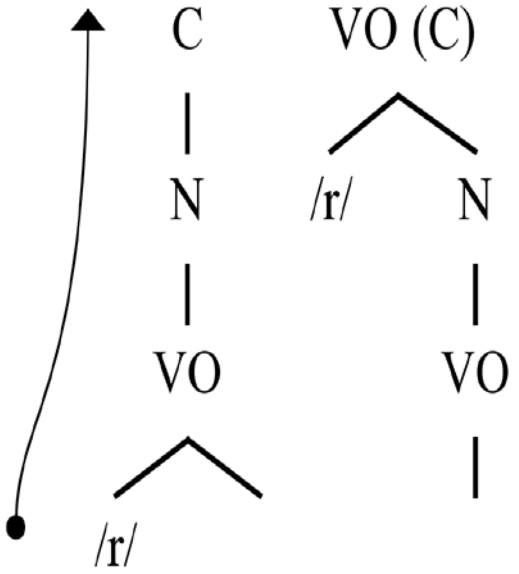


Sonority and sonorant consonants

- Sonorant consonants vary across languages, both in their phonetic properties and their phonological behavior
- OP structures let us represent this, with important implications for the representation of consonant clusters
- It all starts with how languages define the consonant-vowel distinction

Sonorants and the C-V distinction

- Languages have two options in their cutoff point between consonants and vowels (left)



- Liquids/Approximants are defined by the VO node
  - Depending on the C-V cutoff, they may be *promoted* to the Closure level to reinforce their status as consonants (right)
    - Promotion is a strengthening mechanism
    - Perhaps some sort of restriction against unary nodes at the Closure level
  - This may or may not be accompanied by phonetic obstruentization
  - Promoted sonorants are not absorbable (neither are nasals)

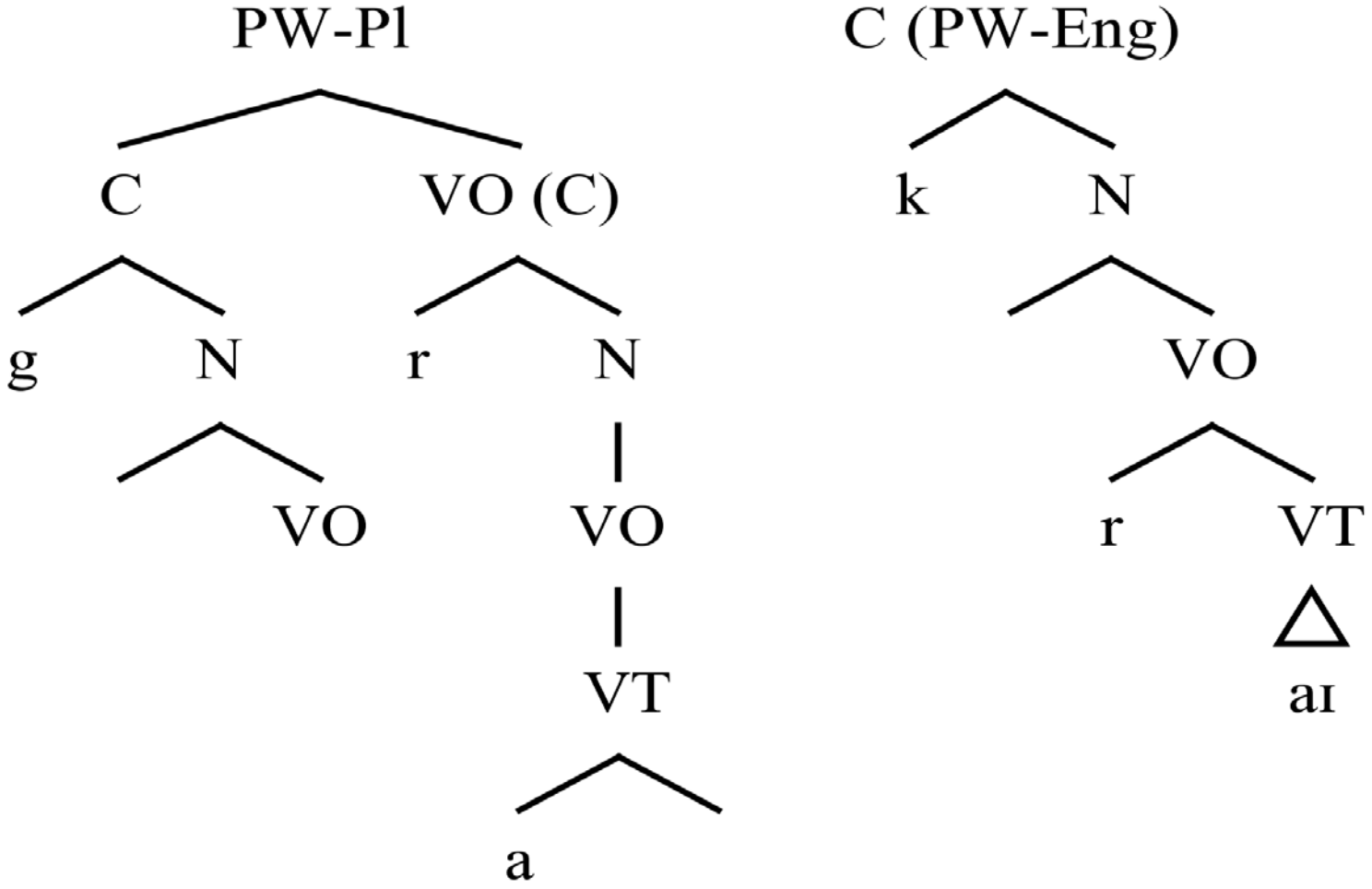
All TRs are not created equal

- When rising sonority clusters are absorbed, we should expect greater phonetic cohesion between the two consonants
- That is because they are contained in a single Closure constituent
- This is what we find in English stop-approximant clusters
  - devoicing in *clear* and *quite*; affrication in *try*; j-coalescence in *tune* (in British English)
  - Complex articulatory organization of onset clusters (e.g. Marin & Pouplier 2010)

All TRs are not created equal

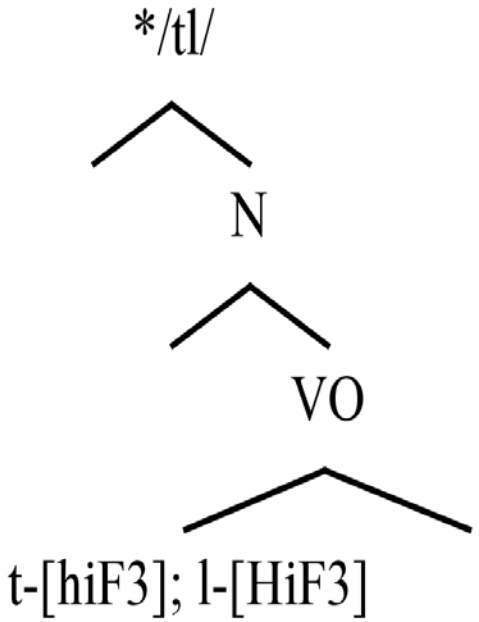
- When rising sonority clusters are not absorbed, we should expect less phonetic cohesion between the two consonants
- That is because they are not contained in a single Closure constituent
- This is what we find in Polish TR clusters
  - Evidence for simplex articulatory organization of onset clusters
    - Intrusive vocoids, lack of devoicing
  - Clusters behave as if they were made up of two units
    - CV words in Polish are sub-minimal, CCV words are not

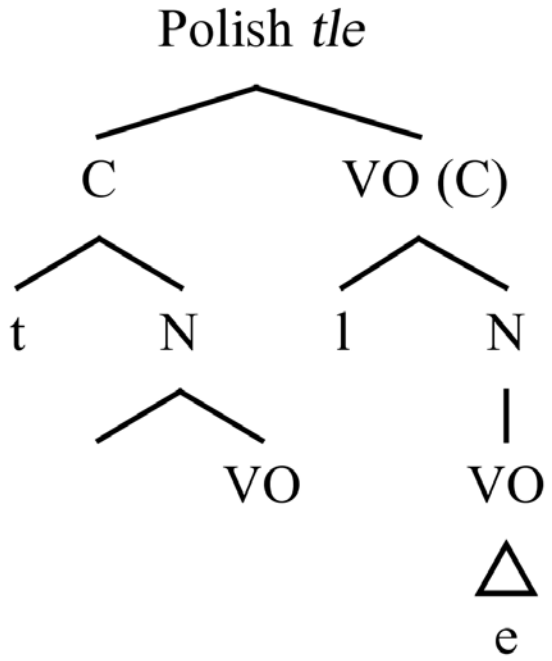
Polish /#gr/ vs. Eng. /#kr/



*tl onsets (*am.ply* vs. *ant.ler*; Polish *tle*)

- /t/ and /l/ are both cued by a high F3 transition (e.g. Stevens 1998)
- An absorbed /tl/ presents challenges for the parse of the formant cue on VO
- In languages where /tl/ occurs, it is not due to absorption, and should be produced asynchronously





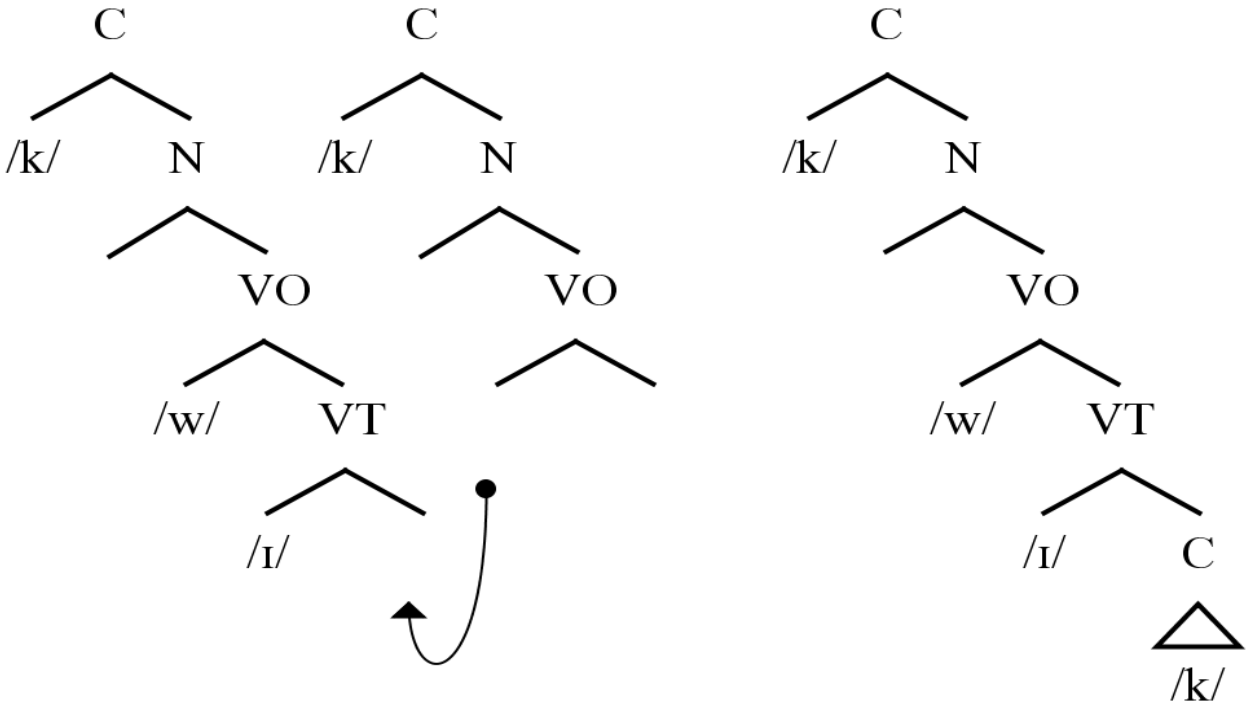
Interim summary

- So far we've seen two mechanisms
  - *Absorption* creates CVs and TR clusters, joining segments together
  - *Promotion* strengthens sonorants and prevents TR absorption

- What about consonants that are final or fall before obstruents?

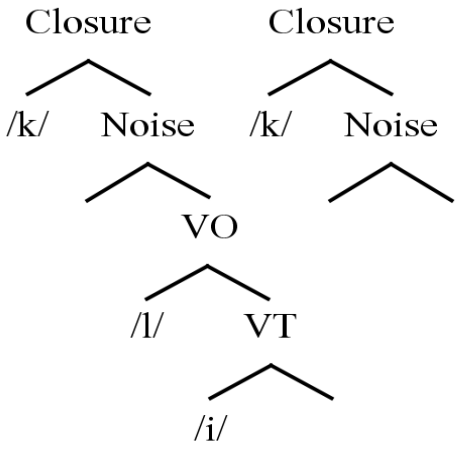
Submersion

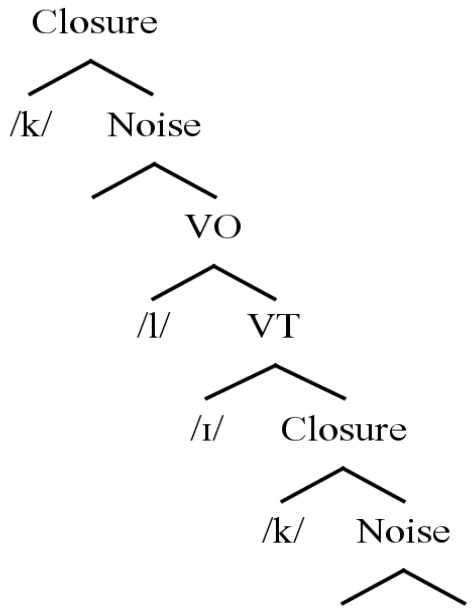
- Consider English *quick*
- the final /k/ cannot stand by itself, and may be *submerged* underneath the preceding vowel
- If a language does not allow submersion, the /k/ must be joined at higher level of structure (or just hangs there)
- The representational system allows for two types of ‘codas’



Two types of codas and stop release

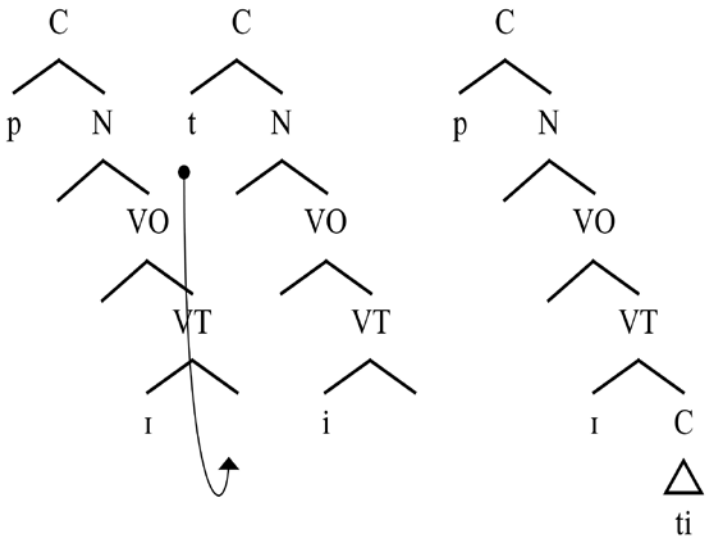
- Polish *klik* ‘click’ vs. English *click*
- The Polish final /k/ is not submerged (left) and must be released; the English final /k/ is submerged and may be left unreleased
- Stop release may be suppressed in English, since the configuration produces more robust VC transitions
  - With submerged codas, sufficient discriminability (Lindblom 1990) does not require release bursts



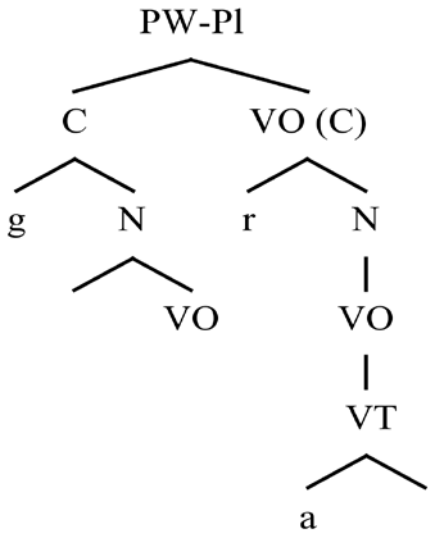


A quick digression

- Submersion creates ‘ambisyllabic’ configuration (Kahn 1976): single OP constituent contains two ‘syllables’
  - Lenition possible in submerged structures (structures of *pity*)
  - May occur at boundaries in English



- The ‘syllable’ is epiphenomenal, deriving from an iteration of an active VT node
  - We’ve already seen a case in which a single syllable spans two constituents (Polish *gra* ‘game’ with non-absorbed cluster)

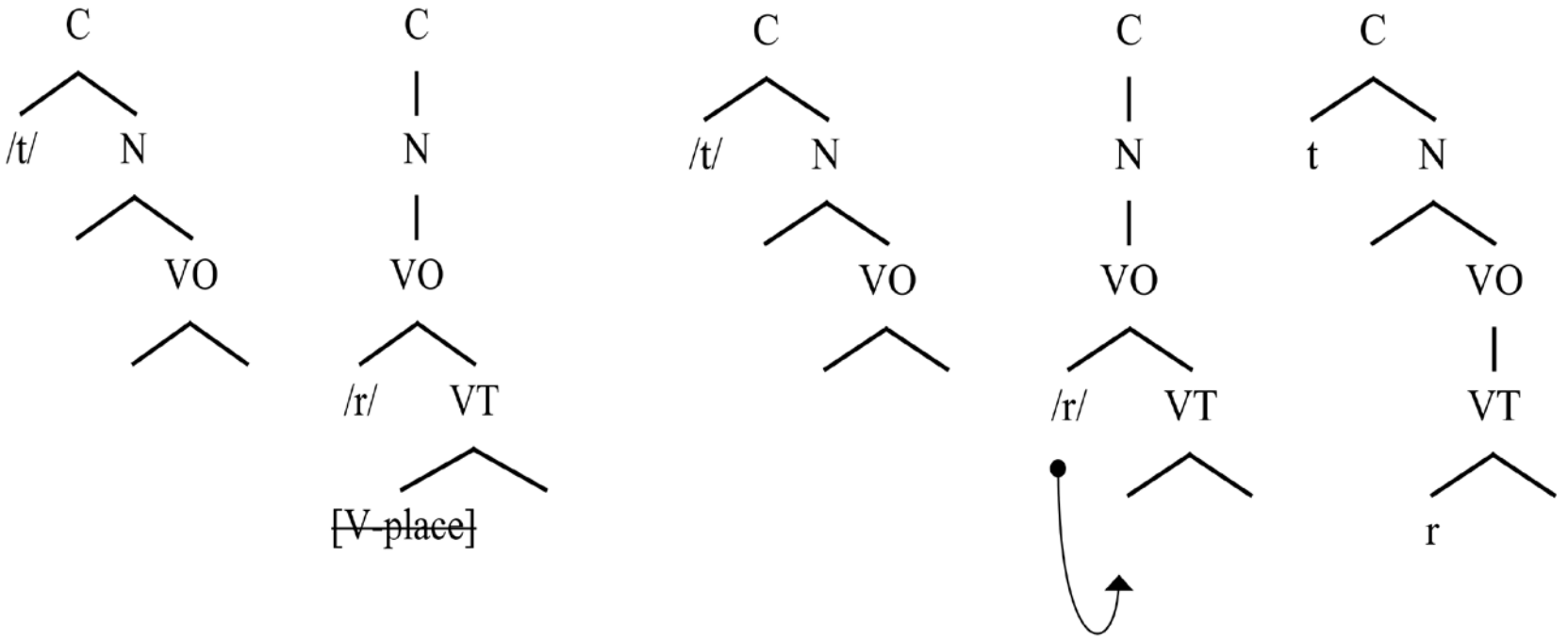


Submersion and consonant ‘syllabicity’

- Since ‘syllables’ and ‘consonants’ derive from the same hierarchy, explaining the origins of syllabic consonants is straightforward
- A ‘syllabic’ consonant has undergone submersion and lies under the VT level
  - There is no such thing as a ‘nucleus’
  - Any consonant may be syllabic, though we should expect obstruents, which are larger structures to be less susceptible to submersion
  - Tashlhiyt Berber (TB) shows us that there are two types of syllabic consonant

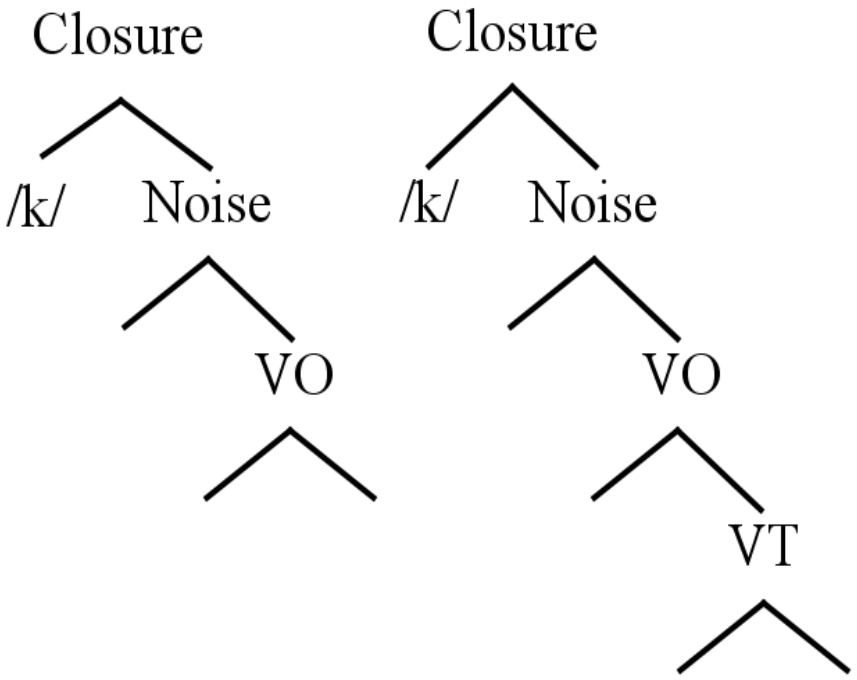
Submersion and consonant ‘syllabicity’

- Consider a TRV sequence (left), in which the vowel has been reduced, losing its place specification
- The /r/should be absorbed; to satisfy *ComplexOnset, the /r/ is submerged (right); syllabicity as repair!



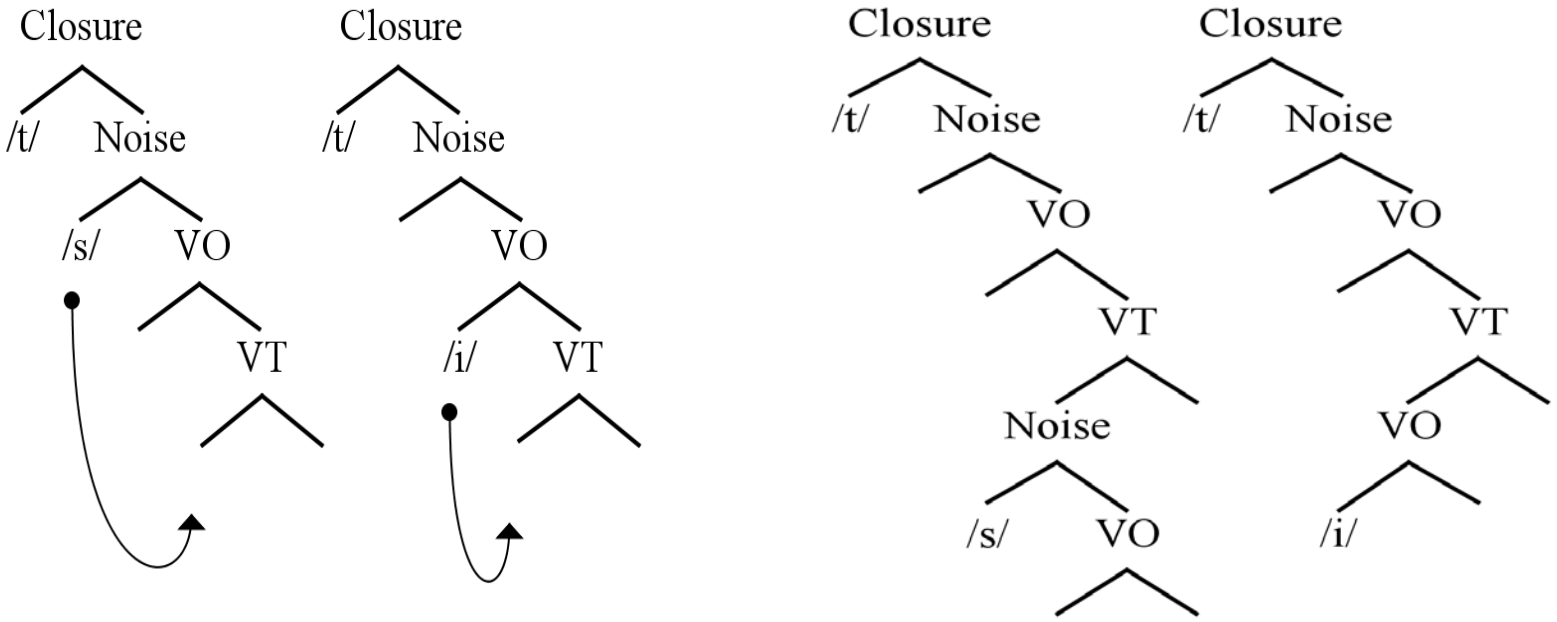
Why is Tashlhiyt Berber unusual?

- Individual segmental representations extracted from entire CV hierarchy, including the VT level
- Left, a stop structure in most languages; Right: a stop structure in Tashlhiyt, which can be a light syllable on its own



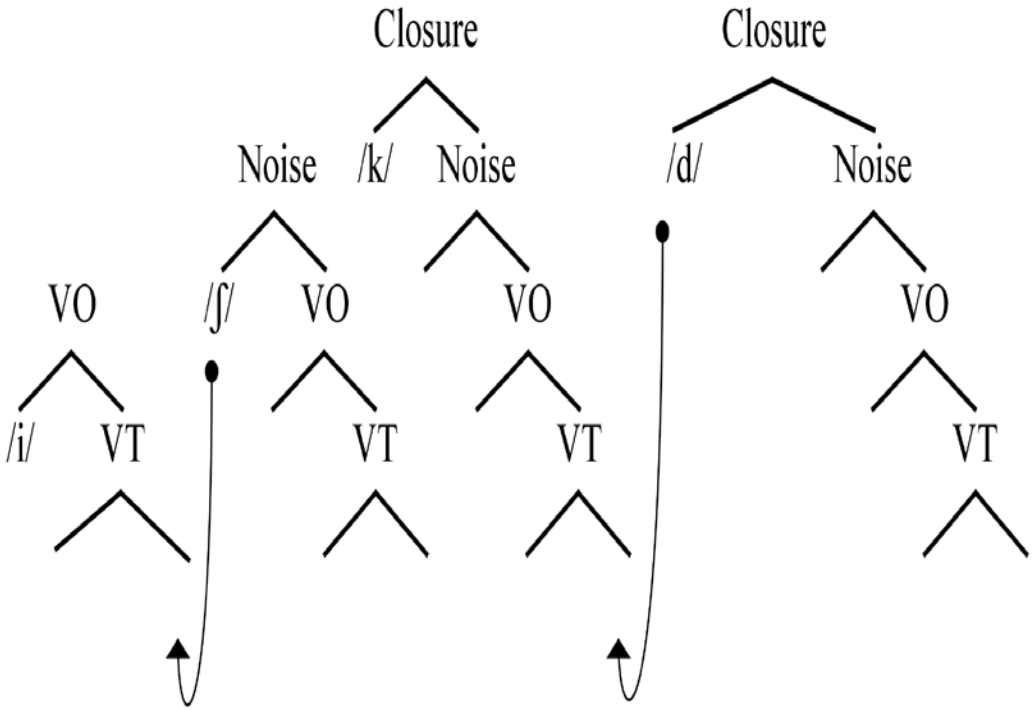
Two types of syllabic consonant

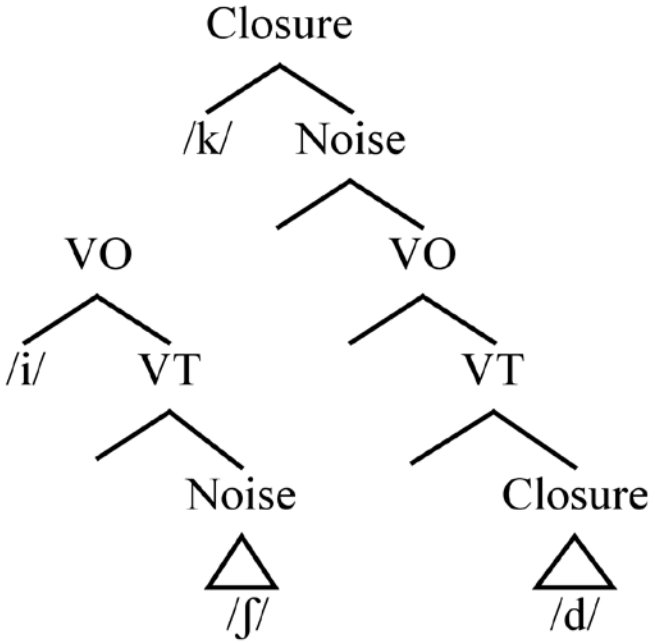
- *ts.ti* (Ridouane 2008): 'complex onset' submersion in absorbed sequences
  - 'nucleus' housed under left branch of VT node



Two types of syllabic consonant

- *iʃ.kd* (Ridouane 2008): coda-type submersion makes falling sonority syllables
  - ‘nucleus’ housed under right branch of VT node





Polish trapped sonorants

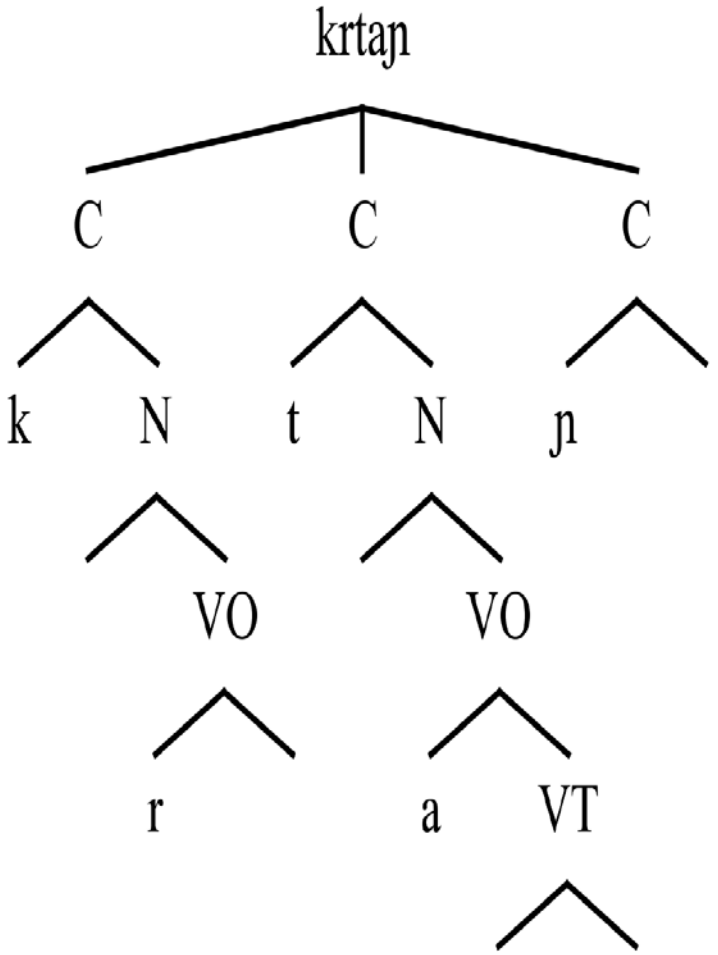
- The Common Slavic word for ‘larynx’ = grŭ.ta.ɲĭ
- The short (yer) vowels were lost . . .
- In Czech, the /r/ became syllabic, *hr.tan*
- In Polish, we get *krtań*, a one-syllable word with an onset /krt/
- Interestingly, this type of cluster in Polish has been analysed as a ‘double onset’ (Kuryłowicz 1952), each of which obeys sonority sequencing

Evolution of the trapped sonorant

- The /r/ from the the CS form had been absorbed into the stop
- Then the yer vowels dropped
- Later, sonorants were promoted in Polish
- In words like *krtań* the /r/ was trapped inside the /k/, and couldn't be promoted

Representing *krtań*

- ‘Sonority sequencing’ observed within individual C constituents
- Polish has no formal restrictions on the number of consecutive C constituents containing consonants
- Gaps in cluster inventories are merely the result of the evolution of the Polish lexicon



Interim conclusions

- OP captures some sonority-based generalizations, without giving it formal phonological status
  - Derived from independently motivated manner-based specification
- Greater empirical insight than the traditional sonority scale
  - Phonetic realization of TR-type clusters
  - Prohibitions on *tl onsets
  - Coda stop release
  - Consonant syllabicity and Polish trapped sonorants
- The patterns shown so far have been described in published work, so you can check them out . . . (links on handout)
- Next on the agenda are . . .
  - Coda restrictions and syllable contact

Coda restrictions

- Many authors have claimed that there is a preference for codas of high sonority
- Since OP allows for both submerged and non-submerged codas, this claim must be considered with regard to both types
- We must determine the coda type before talking about restrictions
- Diagnostics include lenition, weight effects

Coda restrictions

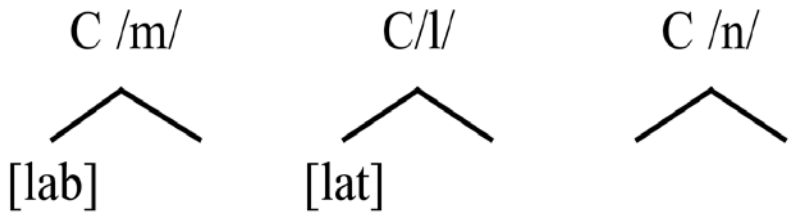
- In languages with submerged codas, restrictions on the size or melodic content of the submerged structure
  - Smaller structures should be more conducive to submersion
  - Submerged structure without melodic features be preferred
- Obstruents usually have larger structures, but this depends on the status of the VO node
- When consonants lack VO . . .
  - An unreleased stop is just a single Closure node
  - A fricative is just a single Noise node
  - All sonorants are just a single node (Closure or VO)
- Coronals or dorsals may be unspecified, but this depends on the language
- If a language does not allow submersion, we shouldn't expect any restrictions on the type of segments that may appear as codas

Syllable contact

- Syllable contact law: requirement that codas be more sonorous than the following onset
- Syllable ‘contact’ is the wrong label; we should be talking about syllable ‘separation’
  - The real focus is what makes a good boundary
- The goodness of a boundary may be read directly off of OP structures
  - A good boundary is when the second segment is higher in the hierarchy than the first
  - Again this depends on the status of the coda

SC case studies (see e.g. Gouskova 2004)

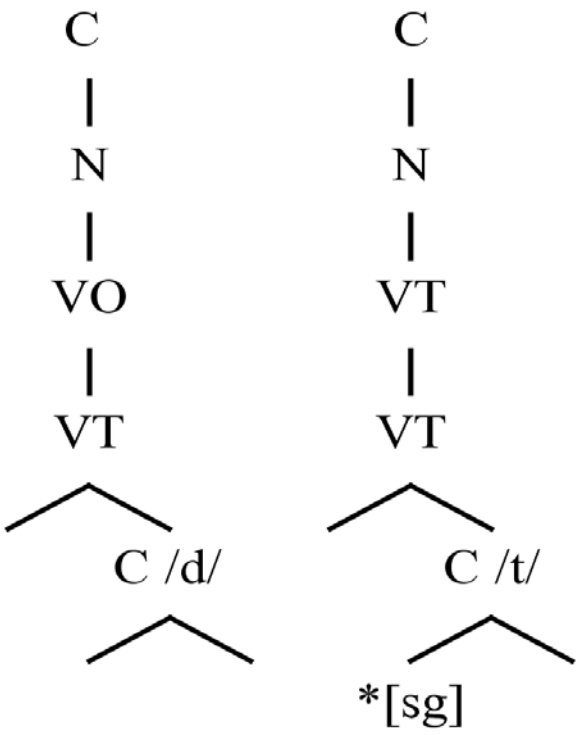
- Onset strengthening when coda is not 'sonorous' enough (Kazakh/Kyrgyz)
  - But in Kyrgyz (Zhu, up next): /n/ strengthens but /m/ does not; /n/ strengthens after /j/ but /l/ does not
  - If laterality is a 'place' feature in Kyrgyz, /l/ (as well as /m/) can be stronger than unspecified /n/



- What makes a 'place' feature?
  - Spectral modulations to formant structure (Traunmüller 1994)
  - Laterals have more consistent spectral effects than /n/ (raised F3)

SC case studies (see e.g. Gouskova 2004)

- Medial cluster syllabification depending on sonority differences (Faroese/Icelandic)
  - Fortis TR clusters are onsets, lenis DR clusters are hetero-syllabic
  - Lenis unspecified for laryngeal features, better candidate for submersion



Thanks for listening ☺

See handout for conclusions and key references